Statistics 3470
Introduction to Probability and Statistics for Engineers
Spring 2018 Syllabus

Class Schedule: MoWeFr: 4:10 – 5:05 pm Stillman Hall (SH) 100

Instructor: Dr. Judit Bach   **Office**: Cockins Hall (CH) 212C
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Office Hours: MWF: 9:15 – 10:15 am and by appointment

Course Description:
The course provides an introduction to probability and statistics targeted toward students in several engineering disciplines. Topics covered include probability, discrete and continuous random variables, probability distributions, expected values, sampling distributions, point estimation, confidence intervals, hypothesis testing and simple linear regression models. A more detailed list of topics can be found in the tentative schedule below. **Students are responsible for all material covered in class, in the assigned readings and in homework problems, and expected to attend all classes.**

Assumed Background Knowledge and Prerequisites:
Calculus, integration, exponential function, finite and infinite sums, union and intersection of sets. Prerequisite courses are Math 1152, 1161.xx, 1172, 1181H, 153, or 254.

Enrollment:
ADD and SECTION CHANGES will be processed (if space is available) starting at 7:30 AM on Tuesday, January 16th on a first-come, first-served basis in room 408A Cockins Hall. Cockins Hall opens by 6am. The instructor does not sign any add or section change forms; these must be taken to Jean Scott in 408A Cockins Hall for a signature.

Textbook:
Probability and Statistics for Engineering and the Sciences (**9th edition**), by Jay Devore **with WebAssign** access. **Alternatively**, the **ebook and WebAssign access** can be purchased through the **OSU WebAssign** access. A paper copy of the book is also available on reserve in the Science and Engineering Library as well as at the Mathematics & Statistics Learning Center (MSLC).

Format of Instruction:
Lecture, 3 contact hours per week.

College of Arts and Sciences GEC Statement:
Statistics 3470 satisfies the General Education (GE) requirement in Data Analysis.

Goals*: Students develop skills in drawing conclusions and critically evaluating results based on data.

Expected Learning Outcomes*: Students understand basic concepts of statistics and probability, comprehend methods needed to analyze and critically evaluate statistical arguments, and recognize the importance of statistical ideas.

Methods*: The focus of this course includes understanding of theoretical concepts, as well as problem solving applications of probability models and statistical inference. Examples include sampling, computing confidence intervals, hypothesis testing, and statistical modeling using regression.

Homework: There are 11 **online homework assignments** tentatively scheduled throughout the semester. They are specified and **need to be turned in online through Webassign.** There are turn-in (for grade) homework sets as well as suggested homework sets for additional practice. The due dates are listed in the tentative daily schedule below and are also specified on Webassign. Instead of dropping the lowest homework score, the following better option will be given: An overall 80% performance on the homework assignments will count as 100% performance for the weight of the homework portion of the final grade. (accordingly a 40% performance will count as a 50% for the homework portion etc.) **It is highly recommended that you reserve a notebook to record how you solved the homework problems!** It will be helpful when it is time to study for an exam. Solutions for homework assignments will be posted on Carmen after their due dates. (Goto: https://www.webassign.net/osu/login.html and either login or purchase a new account).

Exams:
There are two exams during the semester and a final exam. The exams are **closed book exams** with about 4-7 essay questions (6-12 essay for the final exam) **similar** in style and difficulty level to the suggested and turn-in homework problem versions in the **book** and to the lecture examples. For each exam, you will be permitted one sheet of 8.5" x 11" **handwritten paper with formulas** you find helpful. (both sides of the paper may be used). The final exam is on Monday, April 30, 2017 from 4:00 - 5:45 pm. For the final exam, two sheets of 8.5" x 11" paper (same rules as above) may be brought. The final exam will be cumulative, with a slight emphasis on those topics covered after the second midterm. A calculator should also be brought to all exams (no cell phone calculators or PDAs). Full credit for each exam problem can only be earned through showing your justification for or work on each problem. Answers without work will **not** receive full credit.

Attendance:
We use TopHat for attendance. Please, go to the **TopHat** Home page (https://tophat.com/) and either **login** (https://app.tophat.com/login) or **signup for an account** (https://app.tophat.com/register/), which is free for students at The Ohio State University. Please, use your **first and last name**, and add yourself to our class-list by using the following **Join Code** (within TopHat)**: 611660**.

Grading:
The final course grade will be based on:
Homework (online: Webassign).. . . . . 20%
Exam 1 (Monday February 19th). 25%
Exam 2 (Friday, April 6th)…………. . . . . ………… 25%
Final Exam (Monday, April 30th)……. 30%
                                                                                              100%

Percentage Grading Scale:
93% A   90% A-   87% B+   83% B   80% B-   77% C+   73% C   70% C-   67% D+   60% D

Study Rooms and Help Hours - MSLC (Mathematics and Statistics Learning Center)
Our TAs hold office hours in the Mathematics and Statistics Learning Center in Cockins Hall room 134 starting the second week of classes. More details are on the MSLC webpage at http://mslc.osu.edu

Communication Devices:
Cell phones, PDAs and other communication devices must be either turned off or put on vibrate during class. Please refrain from texting during class as a courtesy to those sitting around you. All electronic devices other than a calculator must be shut off and put away during examinations.

E-mail Correspondence:
In order to protect your privacy, all course e-mail correspondence must be done through a valid OSU name.nn account. If you have not activated your OSU email account, you can activate your account at https://my.osu.edu/ . **All e-mail correspondence regarding the class must have "Stat 3470" in the subject field.**

Drop Date:
The last day to drop the course without a 'W' appearing on your record is Friday, February 2, 2018.
The last day to drop the course without petitioning is Friday, March 23, 2018

Receiving an `I' for the Course:
You cannot receive an incomplete for the course unless 65% of the work in the course has been completed. Extenuating circumstances will be handled on a case-by-case basis.

Advice:
1. A tentative lecture schedule is given in this syllabus. Please, give a first reading to scheduled text sections **before** the lecture that covers that material.

2. The course moves rather quickly. If you are having difficulty, please **get help** as soon as possible. Homework assignments can be difficult if you wait until the last minute before trying any problems.

3. It is important that you provide sufficient details in writing up solutions to the problems for grading. It is also important that your solutions be **presented neatly in a clear, easy to read and follow** format. No credit will be given for work that is too sloppy or difficult to read.

4. The material becomes more complex as it moves along. The first exam material may feel easy compared to the second exam. **Keep working along** as the semester progresses.

5. Having the opportunity to use formula sheets on the exams also means that you are not given formulas and it is **your responsibility** to create your formula sheet and gather the necessary formulas you may need on an exam. Collecting important formulas along the way as we learn them is a good organized way to prepare your formulas sheet.

6. If you have a re-grade request on an exam, the request needs to be **written** on a sheet of paper attached to your original paper, within one week of the date the paper was first returned to class. If you are absent the day a graded paper is first returned to the class, it is your responsibility to come to me to get it in less than a week if you want to have a re-grade option available to you.

Academic Misconduct: Please help maintain an academic environment of mutual respect and fair treatment. You are expected to produce original and independent work on the exams. Although students are often encouraged to work or study together; even on homework assignments, all students must finalize and submit their own work individually.

Academic Misconduct Statement:
It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term 'academic misconduct' includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/.

Sexual Misconduct/Relationship Violence Statement
Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at http://titleix.osu.eduor by contacting the Ohio State Title IX coordinator, Kellie Brennan, at titleix@osu.edu.

Addressing Issues of Differing Abilities:

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: **slds@osu.edu**; 614-292-3307; **slds.osu.edu**; 098 Baker Hall, 113 W. 12th Avenue**.**

Mental Health Statement:
As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-800-273-TALK or at suicidepreventionlifeline.org.

Diversity Statement :
The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

Note:
This **syllabus and the calendar listed below ARE SUBJECT TO CHANGE**.

Tentative Class Schedule and Reading assignments

Date	Topic	Section
M-Jan 8	Course Introduction; Sample Spaces and Events	2.1
W-Jan 10	Axioms and Properties of Probability	2.2
F-Jan 12	Counting Techniques	2.3
M-Jan 15	**No Class Martin Luther King Jr. Day**	
W-Jan 17	Counting Techniques, Conditional Probability	2.3, 2.4
F-Jan 19	Conditional Probability, Bayes' Theorem and Independence	2.4, 2.5
M-Jan 22	Bayes' Theorem and Independence, Random Variables;	2.4, 2.5, 3.1 **Hw 1 due (2.1-3)**
W-Jan 24	Random Vars, Discrete Distributions; pmf, cdf, Expected Values;	3.2, 3.3
F-Jan 26	Expected Values; Binomial Distribution	3.3, 3.4 **Hw 2 due (2.4-5)**
M-Jan 29	Binomial Distribution; Poisson Distribution	3.4, 3.6
W-Jan 31	Poisson Distribution, Probability Density Functions; cdf	3.6, 4.1, 4.2 **Hw 3 due (3.1-3)**
F-Feb 2	Probability Density Functions; cdf, Expected Values & Variances	4.1, 4.2
M-Feb 5	Probability Density Functions; cdf, Expected Values & Variances	4.1, 4.2
W-Feb 7	Normal (Gaussian) distribution	4.3
F-Feb 9	Normal (Gaussian) distribution, Exponential and Gamma Distrs.	4.3, 4.4 **Hw 4 due (3.4,3.6,4.1)**
M-Feb 12	Exponential and Gamma Distributions	4.4
W-Feb 14	Jointly Distributed Random Variables	5.1
F-Feb 16	Jointly Distributed Random Variables, Expected Values	5.1, 5.2 **Hw 5 due (4.2-4)**
M-Feb 19	**EXAM 1**	**Ch. 2-4**
W-Feb 21	Expected Values, Covariance & Correlation, Sample Mean Distr.	5.2, 5.3
F-Feb 23	Distribution of the Sample Mean; Central Limit Theorem	5.3, 5.4
M-Feb 26	Central Limit Theorem, Distribution of a Linear Combination	5.4, 5.5
W-Feb 28	General Concepts of Point Estimation	6.1
F-Mar 2	General Concepts of Point Estimation, Methods of Point Estimation	6.1, 6.2 **Hw 6 due (5.1-4)**
M-Mar 5	Methods of Point Estimation	6.2
W-Mar 7	Methods of Point Estimation, Basic Properties of Conf. Intervals	6.2, 7.1
F-Mar 9	Basic Properties of Confidence Intervals, Conf. Ints. for a Pop. Mean	7.1, 7.2
M-Mar 12	**No Class Spring Break**	
W-Mar 14	**No Class Spring Break**	
F-Mar 16	**No Class Spring Break**	
M-Mar 19	Confidence Intervals for a Population Mean	7.2 **Hw 7 due (6.1-2)**
W-Mar 21	Confidence Intervals for a Population Mean and Proportion	7.2, 7.3
F-Mar 23	Confidence Intervals for a Population Mean and Proportion	7.2, 7.3
M-Mar 26	Hypothesis and Test Procedures, Tests About a Population Mean	8.1, 8.2 **Hw 8 due (7.1-3)**
W-Mar 28	Tests About a Population Mean	8.2
F-Mar 30	The One Sample *t* Test	8.3 **Hw 9 due (8.1-2)**
M-Apr 2	Tests About a Population Proportion	8.4
W-Apr 4	Goodness-of-Fit Tests	14.1 **Hw 10 due (8.3-4)**
F-Apr 6	**EXAM 2**	**Ch. 5-8**
M-Apr 9	Simple Linear Regression Model, Estimating Model Parameters	12.1, 12.2
W-Apr 11	Estimating Model Parameters; Inferences About the Slope	12.2, 12.3
F-Apr 13	Inferences About the Slope; Inferences About Estimates	12.3, 12.4
M-Apr 16	Inferences About Estimates	12.4
W-Apr 18	Assessing Model Adequacy	13.1
F-Apr 20	Multiple Regression	13.4 **Hw 11 due (14.1,12.1-4)**
M-Apr 23	Multiple Regression	13.4
M-Apr 30	**Monday 4:00-5:45 pm Final Exam**	**Cumulative**