

**Statistics 3470**  
**Introduction to Probability and Statistics for Engineers**  
**Spring 2019 (Section 20343) Syllabus**

**Class Schedule:** MWF: 8:00 – 8:55 am 209 W 18<sup>th</sup> Ave 160 (EA 160)

**Instructor:** Dr. Judit Bach    **Office:** Cockins Hall (CH) 212C

**E-mail:** [bach.20@osu.edu](mailto:bach.20@osu.edu)    Phone: (614) 292-0729 (primary communication is e-mail !)

**Office Hours:** MoTuTh: 9:15 – 10:10am 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 Monday, January 14<sup>th</sup> on a first-come, first-served basis in room 332 Cockins Hall. The instructor does not sign any add or section change forms; these must be taken to Jean Scott in 332 Cockins Hall for a signature.

**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.

**Attendance:**

We use **TopHat** for attendance (80% will count as 100%, similarly to Homework; see below). It is required to bring a **portable device** (e.g. tablet, cell phone, laptop, or clicker) to the classes to access the TopHat classroom participation system. 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. **Important:** your account must include: **your first (given) and last (family) name, exactly as you are listed on Carmen along with your OSU name.# e-mail account as your primary email account. Join Code** for our class (within TopHat): **890312**.

### **Textbook and WebAssign:**

The Course **Textbook** is: **Probability and Statistics for Engineering and the Sciences (9th edition), by Jay Devore.**

**A paper copy of the textbook is also available on reserve in the Science and Engineering Library as well as at the Mathematics & Statistics Learning Center (MSLC).**

You will also need to purchase access to the **online homework system**, which is Cengage – WebAssign. You can either purchase different options of Cengage – WebAssign access online (which will include an access for an online version of the textbook) depending on what is the best version for your need across all your classes, or you can choose to buy a new textbook with an access code for the online system. The following information is helpful in making decision:

Here is a link to a video sent by Casey Barton, our OSU Cengage representative, where he explains some of the options. Here is the video link:

<https://youtu.be/Y8EmRRt8uMw>

Here's a link to the Ohio State customized purchase site:

<http://services.cengagebrain.com/course/site.html?id=3057665>

Here is the Cengage Support Web page if you need assistance with your registration process:

[support.cengage.com/](http://support.cengage.com/)

This and some additional information regarding WebAssign is posted on our Carmen Canvas class page in the Modules.

**Homework:** There will be 11 **online homework assignments** tentatively scheduled throughout the semester. They **need to be turned in online through WebAssign**. There will be turn-in (for grade) homework sets as well as practice sets, which will include both the turn in sets and suggested homework sets for additional practice. The due dates for the turn-in sets 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 the turn-in homework assignments will be posted on Carmen after their due dates.

### **Exams:**

There are two midterm exams during the semester and a final exam. The exams are **closed book exams**. For each midterm exam, you will be permitted to bring your own prepared one of 8.5" x 11" (back to back) paper as your "cheat sheet" with formulas and any additional information you find helpful. **The final exam is cumulative.** For the Final Exam you will be permitted to bring two of such above described sheets. The exam dates are listed in the grading below, as well as in the tentative daily class schedule. Exam locations will be posted closer to the exam dates. Exam formats will include both multiple choice (ca. 3-10), and essay questions (ca. 3-7). **All exams will be coordinated evening exams; all sections will take the exams at a common time.** Students who have a conflict with the primary exam time (due to a class or some other event) must e-mail the instructor **at least two weeks before the scheduled exam.** **Late requests for make-up exams may be denied.**

### **Expectations:**

You will be assessed on your learning of ideas, concepts, and achievement of skills presented during lecture, on the course website, and in assigned readings. You should expect that **some** ideas, concepts or skills in assigned reading may **not** be reiterated in the lecture.

**Grading:**

The final course grade will be based on:

Homework (online: WebAssign).....	18%
Attendance and Participation (using TopHat.....	2%
Exam 1 (Tuesday, February 19 5:30-6:25pm).....	25%
Exam 2 (Thursday, March 28 5:20-6:15pm) .....	25%
Final Exam (Wednesday, April 24 8:00-9:45pm).....	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 122 starting the second week of classes. More details are on the MSLC webpage at <http://mslc.osu.edu>

**Communication Devices:**

Other than the above listed TopHat activities, please otherwise refrain from using portable devices 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.# 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 8:00am” in the subject field.**

**Drop Date:**

The last day to drop the course without a ‘W’ appearing on your record is Friday, February 1, 2019.  
The last day to drop the course without petitioning is Friday, March 22, 2019

**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. Give a first reading to scheduled text sections **before** the lecture that covers that material. Announcements made in class or on Carmen Canvas supersede information in this syllabus. It is **your** responsibility to be up to date about the announcements.
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. Having the opportunity to use your own “cheat sheet”(s) on the exams also means that you are not given formulas and it is **your responsibility** to create your 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 sheet.
4. 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 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/>.

**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](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12<sup>th</sup> 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](http://ccs.osu.edu) or calling [614-292-5766](tel: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](tel: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](http://suicidepreventionlifeline.org).

**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.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at [titleix@osu.edu](mailto:titleix@osu.edu).

**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

	<b>Date</b>	<b>Topic</b>	<b>I</b>
1	<b>M-Jan 7</b>	Course Introduction; Sample Spaces and Events	2.1
2	<b>W-Jan 9</b>	Axioms and Properties of Probability	2.2
3	<b>F-Jan 11</b>	Counting Techniques	2.3
4	<b>M-Jan 14</b>	Counting Techniques, Conditional Probability	2.3, 2.4
5	<b>W-Jan 16</b>	Conditional Probability, Bayes' Theorem and Independence	2.4, 2.5 <b>Hw 1 due (2.1-3)</b>
6	<b>F-Aug 18</b>	Bayes' Theorem and Independence, Random Variables;	2.5, 3.1
	<b>M-Jan 21</b>	<b>No class--- Martin Luther King Jr. Day</b>	
7	<b>W-Jan 23</b>	Random Vars, Discrete Distributions; pmf, cdf, Expected Vals;	3.2, 3.3 <b>Hw 2 due (2.4-5)</b>
8	<b>F-Jan 25</b>	Expected Values; Binomial Distribution	3.3, 3.4
9	<b>M-Jan 28</b>	Binomial Distribution; Poisson Distribution	3.4, 3.6
10	<b>W-Jan 30</b>	Poisson Distribution, Probability Density Functions; cdf	3.6, 4.1, 4.2 <b>Hw 3 due (3.1-3)</b>
11	<b>F-Feb 1</b>	Prob. Density Functions; cdf, Expected Values & Variances	4.1, 4.2
12	<b>M-Feb 4</b>	Prob. Density Functions; cdf, Expected Values & Variances	4.1, 4.2
13	<b>W-Feb 6</b>	Normal (Gaussian) distribution	4.3 <b>Hw 4 due (3.4,3.6,4.1)</b>
14	<b>F-Feb 8</b>	Exponential and Gamma Distributions	4.4
15	<b>M-Feb 11</b>	Jointly Distributed Random Variables	5.1
16	<b>W-Feb 13</b>	Jointly Distributed Random Variables, Expected Values	5.1, 5.2 <b>Hw 5 due (4.2-4)</b>
17	<b>F-Feb 15</b>	Exp. Values, Covariance & Correlation, Sample Mean Distr.	5.2, 5.3
18	<b>M-Feb 18</b>	Distribution of the Sample Mean; Central Limit Theorem	5.3, 5.4
	<b>Tu-Feb 19</b>	<b>Exam 1 5:30-6:25 pm</b> Location to be Announced	<b>Chapters to be announced</b>
19	<b>W-Feb 20</b>	Central Limit Theorem	5.4
20	<b>F-Feb 22</b>	Distribution of a Linear Combination	5.5
21	<b>M-Feb 25</b>	General Concepts of Point Estimation	6.1
22	<b>W-Feb 27</b>	General Concepts and Methods of Point Estimation	6.1, 6.2 <b>Hw 6 due (5.1-5)</b>
23	<b>F-Mar 1</b>	Methods of Point Estimation	6.2
24	<b>M-Mar 4</b>	Basic Properties of Confidence Intervals	7.1
25	<b>W-Mar 6</b>	Confidence Intervals for a Population Mean	7.2 <b>Hw 7 due (6.1-2)</b>
26	<b>F-Mar 8</b>	Confidence Intervals for a Population Mean and Proportion	7.2
	<b>M-Mar 11</b>	<b>No Class Spring Break</b>	
	<b>W-Mar 13</b>	<b>No Class Spring Break</b>	
	<b>F-Mar 15</b>	<b>No Class Spring Break</b>	
27	<b>M-Mar 18</b>	Confidence Intervals for a Population Proportion	7.2
28	<b>W-Mar 20</b>	Intervals Based on a Normal Population Distribution	7.3 <b>Hw 8 due (7.1-3)</b>
29	<b>F-Mar 22</b>	Hypothesis and Test Procedures	8.1
30	<b>M-Mar 25</b>	Tests About a Population Mean	8.2
31	<b>W-Mar 27</b>	Tests About a Population Mean; The One Sample $t$ Test	8.2, 8.3 <b>Hw 9 due (8.1-2)</b>
	<b>Th-Mar 28</b>	<b>Exam 2 5:20-6:15 pm</b> Location to be Announced	<b>Chapters to be announced</b>
32	<b>F-Mar 29</b>	The One Sample $t$ Test	8.3
33	<b>M-Apr 1</b>	Tests About a Population Proportion	8.4
34	<b>W-Apr 3</b>	Goodness-of-Fit Tests	14.1 <b>Hw 10 due (8.3-4)</b>
35	<b>F-Apr 5</b>	Simple Linear Regression Model, Review for Exam 2	12.1
36	<b>M-Apr 8</b>	Simple Linear Regression; Estimating Model Parameters	12.1, 12.2
37	<b>W-Apr 10</b>	Estimating Model Parameters; Inferences About the Slope	12.2, 12.3
38	<b>F-Apr 12</b>	Inferences About the Slope; Inferences About Estimates	12.3, 12.4
39	<b>M-Apr 15</b>	Inferences About Estimates (Mean and Prediction)	12.4
40	<b>W-Apr 17</b>	Assessing Model Adequacy	13.1 <b>Hw 11 due (14.1,12.1-4)</b>
41	<b>F-Apr 19</b>	Transformed Variables; Multiple Regression	13.2, 13.4
42	<b>M-Apr 22</b>	Multiple Regression	13.4
	<b>W-Apr 24</b>	<b>Final Exam 8:00-9:45 pm</b> Location to be Announced	<b>Cumulative</b>