Spring 2014 – SYLLABUS
Michigan State University
STT 351: Probability and Statistics for Engineering

<table>
<thead>
<tr>
<th>Time and Place:</th>
<th>MW 5:30-6:50pm, A116 Wells Hall</th>
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<tbody>
<tr>
<td>Instructor:</td>
<td>Dr. Marianne Huebner</td>
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<tr>
<td>Office:</td>
<td>A-432 Wells Hall</td>
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<tr>
<td>Phone:</td>
<td>(571) 432 3385</td>
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<tr>
<td>Class Email:</td>
<td>LON-CAPA email + discussion board</td>
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<tr>
<td>Office Hours:</td>
<td>MW 1:30-2:30pm</td>
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<td>Prerequisites:</td>
<td>MTH 234</td>
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**Course description:** Probability models and random variables. Estimation, confidence intervals, tests of hypotheses, simple linear regression. Applications to engineering.

**Requirements:**


**Calculator:** The same calculator policies as for the ACT hold for STT 430: [http://www.actstudent.org/faq/answers/calculator.html](http://www.actstudent.org/faq/answers/calculator.html). It is highly recommended that you have a TI-84, as this is the calculator with statistical functions and would save you a lot of work in the assignments and exams. Some explanations how to use these functions on the TI-84 will be provided in class. FYI, the TI-83 does not have an inverse function for the t-distribution to calculate percentiles.

**Statistical Computing:** Some homework assignments will use R. You are allowed to use other statistical software packages (check with the instructor). For example, Minitab is available in MSU’s computer labs. Excel is not acceptable, it is not a statistical software package.

R is open source and runs on UNIX, Windows, or Mac. To download go to [http://www.r-project.org](http://www.r-project.org). It is maintained by the R core development team, an international team of volunteer developers. It has built-in statistical functions, excellent graphics, and, in some cases, more up-to-date statistical software than commercial products. You can also download the interface R Studio at rstudio.org. However you need R first. The use of R will be demonstrated in class to which you can bring your laptop with R installed if you wish.

**Clickers (Optional):** To assess comprehension and participation during lectures questions will be given requiring your use of I-clickers. You are expected to have an iclicker and to bring your iclicker to the lectures on Mondays and Wednesdays. You can register your I-clicker at [http://www.iclicker.com/registration/](http://www.iclicker.com/registration/). **IMPORTANT:** you
should include only your MSU email address (e.g. sparty@msu.edu) in the box marked “Student ID,” you should NOT enter your PID.

**Lecture:** The lectures are used to present basic ideas. STT 430 is a calculus based probability and statistics course with practical and commonly encountered statistical concepts and methods. The textbook will be followed fairly closely. The course is divided into four units with an exam following each unit. You can use a statistical software package other than R (get instructor’s approval).

Chapter 1: Descriptive statistics (use TI-84, R)
Chapter 2: Probability concepts
Chapter 3: Discrete probability distributions (use TI-84, R)
Chapter 4: Continuous probability distributions (use TI-84, R)
Chapter 5: Joint probability distributions
Chapter 7: Interval estimation, one sample (use TI-84, R)
Chapter 8: Hypothesis testing, one sample (use TI-84, R)
Chapter 9: Two sample inferences (use TI-84, R)
Chapter 12: Simple linear regression (use R)
Chapter 13: Multiple regression (use R)
Chapter 14: Categorical data analysis (use R)
Chapter 16: Quality control methods

Unit 1: chapters 1-3, followed by exam on Monday, Jan 27
Unit 2: chapters 3-5, followed by exam on Monday, Feb 24
Unit 3: chapters 7-9, followed by exam on Monday, Mar 24
Unit 4: chapters 12-14, 16 followed by exam on Wednesday, Apr 23
Comprehensive make-up exam if you miss one exam: Monday, April 28, 5:45pm (tentative).

**Attendance:** You are expected to attend all meetings of the class. If you miss a class for whatever reason, you are responsible for all you missed.

**Help Room:** Statistics Help Room C100 Wells Hall is staffed for certain hours of the week with teaching assistants to give walk-in help. See Help Room schedule posted on [www.stt.msu.edu](http://www.stt.msu.edu).

**Discussion Board:** LON CAPA has a discussion board for this course where you can post questions, tips, or help with questions your class mates may have. Postings that are inappropriate (harmful language, spamming, etc) will be removed and the student posting such content will be banned from using these online resources.

**Statistics with R:** There are many online sources and help forums (e.g. [www.ressek.org](http://www.ressek.org)). The second edition of the following book has good explanations and code.

**Online videos:**
From Google Developers there are a series of tutorials in R on YouTube (1-4 minutes): https://www.youtube.com/playlist?list=PLOU2XLYxmsIK9qQfztXeybpHvru-TrqAP

From the Khan Academy a series of YouTube videos on probability and statistics: http://www.khanacademy.org/math/probability

**Grading:**

*Homework* is assigned in class and will be collected the following Monday at the beginning of the class period. No late homework will be accepted, but for the purposes of computing the final grade you may drop the lowest score. It is necessary to write up your solutions clearly with sufficient explanation in order for it to be considered. Homework problems using statistical software have to be TYPED.

*Quizzes* will be given most Wednesdays or online.

*Exams* are closed books and closed notes, but hand calculators are permitted (see calculator policy above). Exams are worth 50 points each. There will be four exams during the course of the semester. Bring a picture ID! During quizzes and exams, cell phones are to be off and stowed where they cannot be seen. If your phone rings during an exam or you are seen with your phone out of your bag, you will be asked to leave the room and will receive a zero on the test. If you miss one exam, you can take the comprehensive make-up exam during finals week covering the whole semester provided that you have an ironclad excuse, you have taken and passed the other exams, and you contact the instructor on or before the day of the exam to arrange for a conference. A student can only miss one of the three exams to pass the course.

The exams will contain questions concerning text material and problems, classroom examples and discussions, and the output of a statistical software package.

**Grading scale:**

<table>
<thead>
<tr>
<th>Source</th>
<th>Maximum Points</th>
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<tbody>
<tr>
<td>Lecture exams (4)</td>
<td>200</td>
</tr>
<tr>
<td>Computational projects/Homework</td>
<td>100</td>
</tr>
<tr>
<td>Quizzes</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>400</strong></td>
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Your total number of points will be converted into a percentage and your grade will be determined by the following grading scale:

<table>
<thead>
<tr>
<th>Grade Range</th>
<th>Grade</th>
<th>Points</th>
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<tbody>
<tr>
<td>90-100%</td>
<td>4.0</td>
<td>63-69.9%</td>
</tr>
<tr>
<td>83-89.9%</td>
<td>3.5</td>
<td>55-62.9%</td>
</tr>
<tr>
<td>76-82.9%</td>
<td>3.0</td>
<td>50-54.9%</td>
</tr>
<tr>
<td>70-75.9%</td>
<td>2.5</td>
<td>0-49.9%</td>
</tr>
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**Policies:**

Electronic devices: As a courtesy to your classmates and to limit disruptions during lectures or labs, ringtones of phones must be turned off during the class session. Students must not engage in talking on cell phones or text messaging in the classroom. Laptops should be turned off and stored unless authorized by the instructor. Use of computers or mobile devices for activities such as game playing, instant messaging, internet surfing, during class or laboratory sessions are prohibited.

Academic Honesty: The Department of Statistics and Probability adheres to the policies of academic honesty as specified in the General Student Regulations 1.0, Protection of Scholarships and Grades, and in the All-University of Integrity of Scholarship and Grades which are included in Spartan Life: Student handbook and Resource Guide. Student who plagiarize will receive a grade 0.0 in the course or the assignment.

Plagiarism at MSU is taken seriously: “no student shall claim or submit the academic work of another as one’s own.”

Honor Code: “Answers to quizzes, exams, and homework are my own. I will not make solutions to quizzes, exams, and homework available to anyone else whether written by me or others.”

ADA: To arrange for accommodation a student should contact the Resource Center for People with Disabilities (353-9642). http://www.rcpd.msu.edu

Disclaimer: The instructor reserves the right to make any changes she considers academically advisable. Changes will be announced in class. It is your responsibility to keep up with any changed policies and assignments.

Suggested Exercises: We have tentatively selected some exercises from the textbook that illustrate ideas presented in class. If you encounter difficulty or are slow in solving problems, you should re-study the material, seek help, and do additional exercises to improve your mastery of the concepts and methods. The exercises with a * are to be handed in for grading.

1.2: 17, 19*
1.3: 33, 35ab, 41, 38*
1.4: 45 (a. sample mean, b. sample standard deviation, d. sample standard deviation), 47, 57, 56* (boxplot and histogram, stat software), 59

2.1: 3, 4*
2.2: 11, 15, 17, 21, 22*
2.3: 35, 38, * 39
2.4: 47, 49, 53, 61, 60*, 62
2.5: 71, 74*, 77, 79

3.2: 12*, 13, 16, 17, 23
3.3: 29, 32*, 35, 36*, 39
3.4: 47 (d-g, with calculator), 49, 55, 60*, 66*
3.6: 79 (with calculator), 81, 85, 86* (stat software)
Pellets Worksheet: Problems 3(a)(b)

4.1:  1, 5, 7, 8*, 9
4.2:  11, 15, 17, 20*
4.3:  29, 33, 34* (stat software), 35, 37, 39, 40*, 43
4.4:  59, 60*, 61
4.6:  87, 88* (stat software), 89

5.1:  1, 2*, 3, 6
5.2:  22*
5.4:  46, 47, 50*, 51, 53, 55

7.1: 3*, 4, 5, 7
7.2: 20*, 21 (two-sided CI), 23
7.3: 33*(stat software), 34 (two-sided CI and PI), 37, 38*
Computational Lab on CI 1*, 2*, 3*. For each part show the computer results from your simulated samples.

8.1:  3, 5, 6*, 7
8.2:  19, 21, 23, 25, 29a, 32*
8.3:  37, 38a*, 39
8.4:  47, 53, 55, 58*
Computational Lab on Statistical Inference (HT) 4*, 5*

9.2:  19, 23*, 25, 27, 29
9.3:  37a, 39, 40a (stat software), 41
9.4:  49, 51, 53a, 54*

Computational Lab: Regression Lab on Forbes data*
12.1:  1, 3, 7, 9
12.2:  15bc, 16* (stat software) 17, 19, 20
12.3:  31, 33, 35, 38*(stat software)
12.4:  47, 54
12.5:  58*(stat software), 59
13.1:  5, 8

14.1:  3, 7
14.2:  15
14.3:  25, 27, 28*

16.1:  1
16.2:  8*
16.4:  22*

STT 351 - 004
SPRING SEM 2014

Class Begins                                                  1/6/2014
Open adds end (8:00pm)                                       1/10/2014
Last day to drop with refund (8:00pm)                        1/31/2014
Last day to drop with no grade reported (8:00pm)            2/26/2014
Class Ends                                                  5/2/2014