

Introduction to Statistical Methods MATH 330 (spring 2018)

Section 101

(Tuesday and Thursday 19:00–20:50)

INSTRUCTOR

Stanley Max
Lecturer in Mathematics

OFFICE

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OFFICE HOURS

Mondays: 14:00–14:50, 17:00–18:00; Wednesdays: 14:00–14:50, 16:00–17:30

MY WEBSITE

I will sometimes post important and useful information pertaining to the course on my website. (For example, this syllabus is posted there.) To see the correct page, use this URL: www.stanleymax.net, then click on the tab that says “Course material.”

COURSE DESCRIPTION

An introductory course for students with mathematics and computing backgrounds emphasizing statistical ideas and techniques. Descriptive statistics, probability, estimation and sampling, hypothesis testing, regression and correlation, and analysis of variance. The statistical package MINITAB is introduced as a computational tool. Prerequisite: MATH 274.

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QUIZZES

A few quizzes will take place throughout the semester, and these may or may not be announced beforehand. If you are absent without a university-approved excuse, you will receive a grade of zero for that quiz. If you are absent with a university-approved excuse, you will not receive a grade but you will not be allowed to make up the quiz. The two lowest quiz grades will be dropped

Regarding absences, the university catalog makes this statement:

“It is policy of the university to excuse the absences of students for the following reasons:

- illness or injury when the student is unable to attend class
- religious observance where the nature of the observance prevents the student from attending class
- participation in university activities at the request of university authorities (e.g., Intercollegiate Athletics, Forensics Team, Dance Company, etc.)
- compelling verifiable circumstances beyond the control of the student

Students requesting an excused absence must provide documentation to the instructor two weeks prior to the scheduled absence when known in advance or as soon as possible when not known in advance.

TEXTBOOK

One textbook is required for this course::

- Jay Devore, *Probability and Statistics for Engineering and the Sciences* 9th ed. (Cengage Learning, 2016). You can get this book as an e-book via Direct Access. Unless you opt out, you are automatically enrolled in Direct Access. This costs \$97 and that amount will be added to your semester bill. The computer program WebAccess, from which a number of homework problems are assigned, is included if you purchase the textbook using Direct Access. If you do opt out — which you must do by 23:00 on Sunday (February) — and you acquire the textbook by some other means, then you will need to obtain WebAccess directly from Cengage (the publisher of the textbook).

Optionally, you may also purchase the following two items from the University bookstore:

- A physical copy of the textbook in loose-leaf format for \$20.
- *Student Solutions Manual* for the textbook, again in loose-leaf format for \$20. This is useful because it shows the solution to odd-numbered problems in greater detail than the textbook itself does.

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TESTS, MINITAB ASSIGNMENTS, AND ONLINE HOMEWORK

Other components of the course include three tests and a final exam, several short computer projects, and online homework assignments. Their contribution to the semester grade is shown below. I will explain in class how to access this program.

REQUIRED CALCULATOR

A graphing calculator is required for this course. I have posted separate instructions as to the make and model of graphing calculator that I recommend on my website.

ATTENDANCE

I will take attendance at the beginning of every class, and I will consider your attendance at the end of the semester when I consider your final grade. No matter the reason for an absence, **students remain responsible for all instructional activity conducted in each class.**

ACADEMIC INTEGRITY

This class is conducted in accordance with the Towson University Code of Conduct as described in the TU Catalog or accessed at the following website:

https://www.towson.edu/studentaffairs/policies/documents/code_of_student_conduct.pdf

This code prohibits all forms of dishonesty including cheating and plagiarism. Plagiarism is copying the words of another or using the ideas of another without proper citation. Cheating or plagiarism in any form is unacceptable and a penalty commensurate with the offense will be applied. The range of penalties includes deduction of points or rejection of the assignment, failure of the course, or a more severe disciplinary action by university authorities.

DIVERSITY

In accordance with the Towson University Strategic Plan, the Fisher College of Science and Mathematics Diversity Action Plan, and the Department of Mathematics Diversity Action Plan, everyone participating in this course is expected to be respectful of each other without regard to race, class, linguistic background, religion, political beliefs, sex, gender identity or expression, sexual orientation, ethnicity, age, veteran status, or physical ability. If you feel these expectations have not been met, please speak with your instructor or the designated diversity liaison.

DISABILITY SUPPORT SERVICES

Towson University is committed to providing equal access to its programs and services for students with disabilities, in accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with disabilities Act of 1990. To learn how to arrange for any appropriate accommodations, students with disabilities should visit the Disabilities Support Services (DSS) webpage at this URL:

<http://www.towson.edu/dss>

If you are a student with disabilities, then you have the responsibility to let me know that you have needs in this area. You will need a memo from DSS authorizing accommodations.

DETERMINATION OF YOUR GRADE

GRADED COMPONENTS (these values could change slightly)	
Test 1	15%
Test 2	15%
Test 3	15%
Final Exam	20%
Homework	15%
Minitab assignments and Quizzes	15%
Attendance	5%

DETERMINATION OF YOUR GRADE

FINAL GRADE CUT-OFFS (where x is your overall score)	
A	$93\% \leq x \leq 100\%$
A-	$90\% \leq x < 93\%$
B+	$87\% \leq x < 90\%$
B	$83\% \leq x < 87\%$
B-	$80\% \leq x < 83\%$
C+	$77\% \leq x < 80\%$
C	$70\% \leq x < 77\%$
D+	$66\% \leq x < 70\%$
D	$60\% \leq x < 66\%$
F	$0\% \leq x < 60\%$

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SCHEDULE OF TOPICS

The rest of the syllabus contains a detailed list of the textbook sections that we will go over in class, as well as exam dates and the sections with which the exams will deal. The precise scheduling of topics could vary a bit as the semester proceeds, but the dates of the tests are fixed.

Week 1 (January 29 – February 02)	
<u>Lecture</u>	
Syllabus and course outline.	
<i>Section 1.1:</i> “Populations, Samples, and Processes” (pp. 3–12)	
<i>Section 1.2:</i> “Pictorial and Tabular Methods in Descriptive Statistics” (pp. 13–29)	
<i>Section 1.3:</i> “Measures of Location” (pp. 29–36)	
<i>Section 1.4:</i> “Measures of Variability” (pp. 36–44)	

February 06
Change-of-schedule period ends
Last day to drop a course with no grade posted to academic record
Last day to add a course

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Week 2 (February 05 – February 09)	
<p style="text-align: center;"><u>Lecture</u></p> <p><i>Section 2.1:</i> “Sample Spaces and Events” (pp. 53–57)</p> <p><i>Section 2.2:</i> “Axioms, Interpretations, and Properties of Probability” (pp. 64–66)</p> <p><i>Section 2.3:</i> “Counting Techniques” (pp. 66–75)</p> <p><i>Section 2.4:</i> “Conditional Probability” [but omit Bayes Theorem] (pp. 75–85)</p> <p><i>Section 2.5:</i> “Independence” (pp. 85–91)</p>	

Week 3 (February 12 – February 16)	
<p style="text-align: center;"><u>Lecture</u></p> <p><i>Section 3.1:</i> “Random Variables” (pp. 96–99)</p> <p><i>Section 3.2:</i> “Probability Distributions for Discrete Random Variables” (pp. 99–109)</p> <p><i>Section 3.3:</i> “Expected Values” (pp. 109–117)</p>	<p style="text-align: center;"><u>WebAssign homework #1 due</u></p> <p>February 15 at 18:45.</p>

Week 4 (February 19 – February 23)	
<p style="text-align: center;"><u>Lecture</u></p> <p><i>Section 3.4:</i> “The Binomial Probability Distribution” (pp. 117–125)</p>	<p style="text-align: center;"><u>Test 1</u></p> <p>February 20. This test covers Sections 1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 2.4, and 2.5.</p>

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Week 5 (February 26 – March 02)	
<p style="text-align: center;"><u>Lecture</u></p> <p><i>Section 4.1:</i> “Probability Density Functions” (pp. 142–147)</p> <p><i>Section 4.2:</i> “Cumulative Distribution Functions and Expected Values” (pp. 147–156)</p> <p><i>Section 4.3:</i> “The Normal Distribution” (pp. 156–170)</p> <p><i>Section 4.6:</i> “Probability Plots” (pp. 184–193)</p>	<p style="text-align: center;"><u>WebAssign homework #2 due</u></p> <p>March 01 at 18:45</p>

Week 6 (March 05 – March 09)	
<p style="text-align: center;"><u>Lecture</u></p> <p><i>Section 5.3:</i> “Statistics and Their Distributions” (pp. 220–230)</p> <p><i>Section 5.4:</i> “The Distribution of the Sample Mean” (pp. 230–238)</p> <p><i>Section 5.5:</i> “The Distribution of a Linear Combination” (pp. 238–243)</p>	<p style="text-align: center;"><u>WebAssign homework #3 due</u></p> <p>March 08 at 18:45</p>

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Week 7 (March 12 – March 16)	
<p style="text-align: center;"><u>Lecture</u></p> <p><i>Section 6.1:</i> “Some General Concepts of Point Estimation” (pp. 247–264)</p> <p><i>Section 7.1:</i> “Basic Properties of Confidence Intervals” (pp. 277–285)</p> <p><i>Section 7.2:</i> “Large-Sample Confidence Intervals for a Population Mean and Proportion” (pp. 285–294)</p> <p><i>Section 7.3:</i> “Intervals Based on a Normal Population Distribution” (pp. 295–304)</p>	<p style="text-align: center;"><u>WebAssign homework #4 due</u></p> <p>March 15 at 18:45</p>

March 19–23
Spring Break: No classes

Week 8 (March 26 – March 30)	
<p style="text-align: center;"><u>Lecture</u></p> <p><i>Section 8.1:</i> “Hypotheses and Test Procedures” (pp. 310–326)</p> <p><i>Section 8.2:</i> “z Tests for Hypotheses about a Population Mean” (pp. 326–334)</p> <p><i>Section 8.3:</i> “The One-Sample t Test” (pp. 335–346)</p> <p><i>Section 8.4:</i> “Tests Concerning a Population proportion” (pp. 346–352)</p> <p><i>Section 8.5:</i> “Further Aspects of Hypothesis Testing” (pp. 352–356)</p>	<p style="text-align: center;"><u>Test 2</u></p> <p>March 27. This test covers Sections 3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.6, 5.3, 5.4, and 5.5.</p>

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Week 9 (April 02 – April 06)	
<p style="text-align: center;"><u>Lecture</u></p> <p><i>Section 9.1:</i> “z Tests and Confidence Intervals for a Difference between Two Population Means” (pp. 362–373)</p> <p><i>Section 9.2:</i> “The Two-Sample t Test and Confidence Interval” (pp. 374–382)</p>	<p style="text-align: center;"><u>WebAssign homework #5</u></p> <p>April 03 at 18:45</p>

Week 10 (April 09 – April 13)	
<p style="text-align: center;"><u>Lecture</u></p> <p><i>Section 9.3:</i> “Analysis of Paired Data” (pp. 382–391)</p> <p><i>Section 9.4:</i> “Inferences Concerning a Difference between Population Proportions” (pp. 391–398)</p>	<p style="text-align: center;"><u>WebAssign homework #6 due</u></p> <p>April 10 at 18:45</p>

April 09
<p style="text-align: center;">Last day to withdraw with a grade of 'W'</p> <p style="text-align: center;">Last day to change to pass/fail option or audit options</p>

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Week 11 (April 16 – April 20)	
<p style="text-align: center;"><u>Lecture</u></p> <p><i>Section 10.1:</i> “Single-Factor ANOVA” (pp. 410–420)</p> <p><i>Section 10.2:</i> “Multiple Comparisons in ANOVA” (pp. 420–426)</p> <p><i>Section 10.3:</i> “More on Single-Factor ANOVA” (pp. 426–435)</p>	<p style="text-align: center;"><u>WebAssign homework #7 due</u></p> <p>April 17 at 18:45</p>

Week 12 (April 23 – April 27)	
<p style="text-align: center;"><u>Lecture</u></p> <p><i>Section 12.1:</i> “The Simple Linear Regression Model” (pp. 488–496)</p> <p><i>Section 12.2:</i> “Estimating Model Parameters” (pp. 496–509)</p>	<p style="text-align: center;"><u>Test 3</u></p> <p>April 24. This test covers Sections 6.1, 7.1, 7.2, 7.3, 8.1, 8.2, 8.3, 8.4, 8.5, 9.1, 9.2, 9.3, and 9.4.</p>

Week 13 (April 30 – May 04)	
<p style="text-align: center;"><u>Lecture</u></p> <p><i>Section 12.3:</i> “Inferences about the Slope Parameter on the Slope Parameter β_1” (pp. 510–519)</p> <p><i>Section 12.4:</i> “Inferences Concerning $\mu_{Y \cdot X^*}$ and the Prediction of Future Y Values” (pp. 519–527)</p>	

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Weeks 14 and 15 (May 07 – May 15)

<u>Lecture</u>	<u>WebAssign homework #8 due</u>
<i>Section 12.5: “Correlation”</i> (pp. 527–537) <i>Section 13.1: “Assessing Model Adequacy”</i> (pp. 542–550)	May 08 at 18:45

Final Exam to be held on Thursday (May 17) 19:00–21:00