|  |  |  |  |
| --- | --- | --- | --- |
| Name:  |  |  | STA 504-01 |
| Mathematical Statistics I with Calculus Review | Fall 2017 |

**Course Information and Syllabus**

Dr. Tom Short | UNA 111 | tshort@wcupa.edu | 610-436-2369
WCU Public Safety: 610-436-3311

**WCU D2L** <https://d2l.wcupa.edu/d2l/home>

**Office hours** Mondays and Wednesdays from 12 Noon until 2 PM,
 Tuesdays from 4 until 5:30 PM,
 by appointment, by e-mail, and by chance.

**Meeting time and location**



**Course description**

STA 504. Mathematical Statistics I with Calculus Review. 4 Credits.

A rigorous treatment of probability spaces and an introduction to the estimation of parameters. This course will also review relevant calculus topics.

**Course materials**

* *Mathematical Statistics with Applications* (7th ed.), by Wackerly, Mendenhall, and Scheaffer, published in 2008 by Brooks/Cole Cengage Learning. The website for our textbook is <http://www.cengage.com/c/mathematical-statistics-with-applications-7e-wackerly/9780495110811>. A “Student Solutions Manual” is available through the site, and answers to the odd exercises are contained in the textbook itself.
* Please use appropriate technologies to help you to complete the homework and the exams in our course, including R, apps, and calculators. Please plan to use a WCU computer for exams.

**Attendance and late work policy**

If you miss a class meeting, please borrow, copy, and study notes recorded by another student in the class. I will also post scans of the notes I write in class onto our D2L site. Grades for assignments turned in late will be penalized, with increasing penalties as time passes beyond the due date and for repeated occurrences, unless a legitimate excuse is approved by the instructor. Make-up assignments and exams must be arranged on a case-by-case basis, and will be approved only with legitimate excuses. Attendance and class participation may impact borderline grade decisions at the end of the course.

**Learning outcomes and assessment**

In this course, you will encounter the following Program Learning Outcomes and Course Student Learning Outcomes, through instruction and through the accompanying means of assessment.

|  |  |  |
| --- | --- | --- |
| **Applied Statistics Program Learning Outcomes** | **Course Student Learning Outcomes** | **Means of Assessment** |
| 1. Demonstrate an understanding of probability and statistical inference, including the fundamental laws of classical probability, discrete and continuous random variables, expectation theory, maximum likelihood methods, hypothesis testing, power, and bivariate and multivariate distribution theory.
 | Be introduced to the basic ideas and methods of probability theory. | Graded homework assignments and exam content including written solutions to exercises representing Chapters 2, 3, 4, and 5 |
| 1. Demonstrate the ability to apply the elementary methods of statistical analysis, namely those based on classical linear models, categorical methods, and non-parametric ideas to perform data analysis for the purposes of statistical inference.
 | Encounter the rich diversity of applications of probability theory in the sciences. | Graded homework assignments and exam content including written solutions to exercises representing Chapters 3, 4, and 5 |
| Develop a probabilistic foundation in preparation for the study of mathematical statistics. | Graded homework assignments and exam content including written solutions to exercises representing Chapters 3, 4, and 6 |

**Evaluation and grading**

Components of your grade may include required exercises, optional work, in-class tasks, quizzes, a midsemester examination, and a cumulative final examination. The midsemester exam will be given during class on **Tuesday, October 17**, and will be worth 100 points. The final exam will be given on **Tuesday, December 12**, also during our usual class time, and it will also be worth 100 points. Your grade will be computed by finding the percentage of points you earn in the course out of the number of points available to you in the course through required and optional work. A letter grade will be assigned based on performance in the course according to the following scale.

|  |  |  |  |
| --- | --- | --- | --- |
| **Grade** | **Quality Points** | **Minimum Percentage Required** | **Interpretation** |
| A | 4.00 | 93% | Superior graduate attainment |
| A- | 3.67 | 90% |  |
| B+ | 3.33 | 87% | Satisfactory graduate attainment |
| B | 3.00 | 83% |  |
| B- | 2.67 | 80% |  |
| C+ | 2.33 | 77% | Attainment below graduate expectations |
| C | 2.00 | 73% |  |
| C- | 1.67 | 70% |  |
| F | 0 | 0% | Failure |

D grades are not used. Refer to the *WCU Graduate Catalog* for description of NG (No Grade), W, and other grades.

**Course Syllabus**

|  |  |  |
| --- | --- | --- |
| **Date** | **Topics** | **Text reference** |
| **August 29** | **Course information and syllabus and “What Is Statistics?”** | **Chapter 1** |
| **September 5** | **Probability calculations** | **Sec 2.1 - 2.5** |
| **September 12** | **Counting and Probability laws** | **Sec 2.6 - 2.9** |
| **September 19** | **Bayes’ Rule and Random variables** | **Sec 2.10 & 2.11** |
| **September 26** | **Discrete distributions** | **Sec 3.1 - 3.8** |
| **October 3** | **Continuous distributions and review** | **Sec 4.1 - 4.8** |
| **October 10** | ***Fall Break – No class meeting on Tuesday, October 10*** |  |
| **October 17** | ***The midsemester exam will be given on Tuesday, Oct 17*** |  |
| **October 24** | **Moment-generating functions** | **Sec 3.9 & 4.9** |
| **October 31** | **Multivariate distributions** | **Sec 5.1 & 5.2** |
| **November 7** | **Marginal and conditional distributions** | **Sec 5.3** |
| **November 14** | **Independence and Expected values** | **Sec 5.4 - 5.6** |
| **November 21** | **Transformations and Distribution function technique** | **Sec 6.1 - 6.3** |
| **November 28** | **More transformations, and MGF technique** | **Sec 6.4 & 6.5** |
| **December 5** | **Order statistics and review** | **Sec 6.7** |
| **December 12** | ***The final exam will be given on Tuesday, December 12*** |  |

Please see the following document for important dates throughout the semester:
<https://www.wcupa.edu/Registrar/calendar/documents/2YrAcadCalendar16-18Revised1.pdf>

**ACADEMIC & PERSONAL INTEGRITY**

It is the responsibility of each student to adhere to the university’s standards for academic integrity. Violations of academic integrity include any act that violates the rights of another student in academic work, that involves misrepresentation of your own work, or that disrupts the instruction of the course. Other violations include (but are not limited to): cheating on assignments or examinations; plagiarizing, which means copying any part of another’s work and/or using ideas of another and presenting them as one’s own without giving proper credit to the source; selling, purchasing, or exchanging of term papers; falsifying of information; and using your own work from one class to fulfill the assignment for another class without significant modification. Proof of academic misconduct can result in the automatic failure and removal from this course. For questions regarding Academic Integrity, the No-Grade Policy, Sexual Harassment, or the Student Code of Conduct, students are encouraged to refer to the Department Graduate Handbook, the *Graduate Catalog*, the *Ram’s Eye View*, and the University website at <http://www.wcupa.edu>.

You are permitted to use books, web resources, and people (including the instructor and other students) to help you to complete the out-of-class work assigned in our course. However, you must disclose any assistance you receive from external sources. I will consider failure to disclose the resources you use and the assistance you receive as a violation of WCU policies. Duplicating what you perceive to be complete or partial solutions to specific exercises from an existing resource or copying them from another person’s work is not appropriate, even with acknowledgement. I reserve the right to intervene in situations in which I perceive extreme or inappropriate dependence on external resource.

**STUDENTS WITH DISABILITIES**

If you have a disability that requires accommodations under the Americans with Disabilities Act (ADA), please present your letter of accommodations and meet with me as soon as possible so that I can support your success in an informed manner. Accommodations cannot be granted retroactively. If you would like to know more about West Chester University’s Services for Students with Disabilities (OSSD), please visit them at 223 Lawrence Center. The OSSD hours of Operation are Monday through Friday, 8:30 AM until 4:30 PM. The phone number is 610-436-2564, the fax number is 610-436-2600, the email address is ossd@wcupa.edu, and the website is at <http://www.wcupa.edu/ussss/ossd>.

**REPORTING INCIDENTS OF SEXUAL VIOLENCE**

West Chester University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972 and guidance from the Office for Civil Rights, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator, Ms. Lynn Klingensmith. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. Faculty members are obligated to report sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred to the person designated in the University protection of minors policy.  Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at the webpage for the Office of Social Equity at <http://www.wcupa.edu/_admin/social.equity/>.

**EXCUSED ABSENCES POLICY**

Students are advised to carefully read and comply with the excused absences policy, including absences for university-sanctioned events, contained in the WCU Graduate Catalog. In particular, please note that the “responsibility for meeting academic requirements rests with the student,” that this policy does not excuse students from completing required academic work, and that professors can require a “fair alternative” to attendance on those days that students must be absent from class in order to participate in a University-Sanctioned Event.

**EMERGENCY PREPAREDNESS**

All students are encouraged to sign up for the University’s free WCU ALERT service, which delivers official WCU emergency text messages directly to your cell phone. For more information, visit www.wcupa.edu/wcualert. To report an emergency, call the Department of Public Safety at 610-436-3311.

**ELECTRONIC MAIL POLICY**

It is expected that faculty, staff, and students activate and maintain regular access to University provided e-mail accounts. Official university communications, including those from your instructor, will be sent through your university e-mail account. You are responsible for accessing that mail to be sure to obtain official University communications. Failure to access will not exempt individuals from the responsibilities associated with this course.