STAT 512: Applied Regression Analysis — Spring 2014

Division 2   MWF 9:30—10:20am (REC 122)
Division 3   MWF 8:30—9:20am (REC 122)

Instructor: Dr. Min Zhang
Office: 516 Mathematical Sciences Building (5th floor, turn left from the elevator)
Office Hours: Wednesdays 12:00-1:30pm
Appointments: If you cannot come to scheduled office hours, you may arrange an appointment for another time. Please be courteous and make an appointment instead of just "dropping by". You can arrange an appointment by email.
Phone: 765-(49)6-7921
Email: minzhang@stat.purdue.edu

Textbook: Special Reprint of *Applied Linear Statistical Models*, *5th edition,* by Kutner, Neter, Nachtsheim & Li. *(Required),* available at bookstores. The text is large (and heavy, sorry!) and quite wordy, but it does provide lots of examples and graphs which are helpful. I can help you figure out which parts are really important and which parts you can skim over.   You can also purchase the ebook directly from https://create.mcgraw-hill.com/shop/ (ISBN: 9781121683402).

Applied Statistics and the SAS Programming Language, 5th edition, by Cody and Smith *(Recommended).* A lighter textbook, this book provides a gentle, fairly readable introduction to the SAS Programming Language which should prove helpful during all parts of the course.

Web Page: http://www.stat.purdue.edu/~minzhang/teaching.html This page will be used to provide you with information relevant to the course. Such information includes this page, announcements, lecture notes, homework assignments and solutions, reading assignments, data sets, dates of exams, review sheets, and changes to office hours. Please check this page regularly for updates.

Mailing List: A mailing list has been arranged for this course. I will send email to this list with any special announcements or reminders if it is necessary.

Attendance and Participation: You are expected to attend lectures, participate in discussions, and be on time. There will be a sign-up sheet before some randomly selected classes. Part of your grades is based on your attendance and participation. If you must miss a lecture, please let me know in advance.

Class Time: I will try to begin and end every class promptly. It is usually *not* a good time to ask lengthy questions or make appointments right BEFORE classes, since I will be busy setting up the computer, arranging handouts, etc before class. Please email or come to office hours instead. Questions during class are welcomed and encouraged.

Lectures: Lecture notes will usually be displayed on the computer projection screen during class, occasionally supplemented by blackboard sketches and/or overhead transparencies. The computer-displayed notes will be made available to you on the class web page. Usually they will be available in advance of class. We will cover roughly one/two chapters per week, so lectures will go pretty quickly. You are always welcome to ask questions if I need to slow down.

Final Grade: Your final grade will depend on the following components with these proportions: homework (20%), midterm 1 (20%), midterm 2 (20%), final (35%), and attendance (5%). The percentage grades needed to achieve an A, B, C, or D will follow the following scale: $90 - 100$ = A, $80 - 89$ = B, $70 - 79$ = C, $55 - 69$ = D, $0 - 54$ = F. The minimum score needed for a given letter grade could be lowered if necessary but will not be raised.

SAS Computer Software: We will use SAS 9.3 to perform data analysis in this class. The intent of using software is to allow the computer to perform routine calculations and graphing, while we focus on choosing the appropriate analysis tools and interpreting the results. Computer software is NOT a substitute for understanding the statistical methods, and you will not have access to a computer during exams. SAS is available in the Purdue computing labs. You may also obtain a copy of SAS for your own PC for class purposes free of charge by showing your student ID in the Stewart Center, Room G31 (ITaP office hours: 9am to noon and 1-4pm, Monday through Friday). Learning SAS will be one of the biggest challenges in this course, and you should be prepared to devote some time to this, especially in the first few weeks. The only way to learn how to use SAS is to try it! There are several sources of SAS help available. Make use of the SAS help system within the program to look up specific details. Another tool that should not be overlooked is the Web for finding SAS help. If you need help in person, the Statistics Department provides a software consultant in MATH G-175 through [Statistical Consulting Service](), M-F, 10am-4pm;   also   they   provide   a   document   with   a   nice   introduction   to   SAS (<http://www.stat.purdue.edu/scs/help/SASshortcourse.pdf >). You can also get help from the instructor in office hours or by email. SAS manuals (besides the Recommended Text) are available in the bookstore.

Reading: I expect you to read the text as we cover the material, which is about two chapters every week. It can help to read about a topic *before* it is covered in class. This does not mean that I expect you to learn it all on your own. Rather, your reading before the class should be a "first pass" at the subject. The first time through, I just want you to read through it quickly, in order to get a general idea of the material – the "big picture". Don't get bogged down in formulas or details; just try to get a rough idea of the material and get familiar with the vocabulary. This will prepare you for what is to come in the class, and will make the class easier to follow. If, as you are reading, you find something hard to understand, don't be alarmed or discouraged. Just make a note of any parts you found confusing, or any questions that occur to you as you read. Often, you will find that those questions are cleared up in the following class. If not, please ask during class! Later, as you are working on problem sets and studying for tests, you will find it helpful to read the material again. This time, read at a much more detailed level. It will be a lot easier to follow then, since you have already covered the material in class. Repetition and practice are important learning tools.

Examinations: There will be two midterm examinations and a final examination. The dates for midterm will be posted on the course website. Each examination will have both mathematical and conceptual (written) components.

Homework: Homework will be due every **FRIDAY BEFORE CLASS** and the graded homework will be returned within one week. The homework assignment will be posted on the web approximately one week before its due date and solution will also be posted on the class web page. Late homework will not be accepted under any circumstances (late = after class on due date). To allow for illness, family emergencies, conference travel, etc., your lowest two homework grades will be dropped.

Please do not pad your homework with endless printouts of SAS output. Only hand in those parts of the output that are directly relevant to your solution. You should edit any SAS output you plan to hand in by pasting it into an editor such as MS-Word, and getting rid of extra space or unnecessary output. It is helpful to circle or highlight the portions of the output to which you refer in your solution. As a rule of thumb, only hand in what you actually expect the grader to read. SAS output should be pasted into your solution as you are answering the questions.

Homework performs four vital functions in this course:
  i. it gives you an opportunity to practice what you have learned and to understand concepts by actually using them;
  ii. it gives you feedback on what you understand and on what areas need more work;
  iii. it helps you learn SAS

iv. it contributes to your final grade.

Homework must always be stapled if it is longer than one page. If it is not stapled, only the first page will be graded. The first page of each homework set handed in **must** contain the following information:
  i. your name
  ii. my name (Dr. MZ)
  iii. the number of the homework set (e.g. Homework #2)
  iv. the due date
  v. STAT 512
  vi. your division number (2 or 3)
This information is necessary to ensure that your grades are recorded correctly and that your homework is returned to you promptly. Remember that it is a challenge for both instructor and grader to keep track of 12 homework sets throughout the course. The grader may also grade other courses, including other sections of 512, and we don't want to get them mixed up. Please make it easy for us to not lose your homework or grades!

Re-grades: Since the professor and grader are fallible human beings, occasionally errors will occur in grading. For this reason, students are able to request that such an error be corrected. Two types of error can occur. A *type I error* occurs if points are deducted for a correct solution. A *type II error* occurs if sufficient points are not deducted for an incorrect solution. Any request for a re-grade *must* be made *in writing* and *must* abide by the following procedure, or it will be ignored.

1) Attach a new piece of paper to the *front* of the work to be re-graded. This piece of paper should contain the following information
   a) the word "re-grade" displayed prominently
   b) your name and section
   c) which homework set or midterm is involved (e.g. Homework #6)
   d) the relevant problem number(s) (e.g. Problem 7.23)
   e) a detailed explanation of the suspected error ("Please look at problem 4" is <u>not</u> considered a detailed explanation).
   f) the date of resubmission
2) Print out the appropriate pages of the solutions from the web page, and circle the relevant piece of the solution. Attach this *behind* the work to be re-graded.
3) Give this packet to me within one-week after the homework was returned. A verbal explanation is neither necessary nor appropriate since a) I probably won't remember it, and b) the grader will do the regrading anyway.

No exceptions will be made to the above policy. The grader will be responsible for the re-grading and you will receive a written note from the grader explaining the outcome. I will review the grader's response before returning it to you, to make sure the problem was resolved. If the above procedure is not followed, the re-grade request will be denied. Please note that a re-grade request is different from the questions "Can you help me figure out what I did wrong here?", or "I don't understand the posted solutions", which are entirely appropriate for office hours.

General Comments: This is not a math course. However, as in many other science courses, we will make use of mathematics quite extensively, and most questions will have some quantitative component. The use of SAS software will simplify many of the more computational tasks. However, the primary focus of this course is on learning how to do good science. Doing science well requires, among other things, a good experimental design and a correct and appropriate statistical analysis of the scientific data. Therefore, knowing when and when not to use a certain statistical method, and why, and how to interpret the results, are all at least as important as knowing how to actually carry out the calculations. In order to do well in this course, you must be prepared to master all of these areas.

Academic Integrity Statement: Any test, paper or report submitted by you and that bears your name is presumed to be your own original work that has not previously been submitted for credit in another course unless you obtain prior written approval to do so from your instructor. In all of your assignments, including your homework or drafts of papers, you may use words or ideas written by other individuals in publications, web sites, or other sources, but only with proper attribution. "Proper attribution" means that you have fully identified the original source and extent of your use of the words or ideas of others that you reproduce in your work for this course, usually in the form of a footnote or parenthesis.

As a general rule, if you are citing from a published source or from a web site and the quotation is short (up to a sentence or two) place it in quotation marks; if you employ a longer passage from a publication or web site, please indent it and use single spacing. In both cases, be sure to cite the original source in a footnote or in parentheses. If you are not clear about the expectations for completing an assignment or taking a test or examination, be sure to seek clarification from your instructor beforehand.

Finally, you should keep in mind that as a member of the campus community, you are expected to demonstrate integrity in all of your academic endeavors and will be evaluated on your own merits. So be proud of your academic accomplishments and help to protect and promote academic integrity at Purdue. The consequences of cheating and academic dishonesty - including a formal discipline file, possible loss of future internship, scholarship, or employment opportunities, and denial of admission to graduate school - are simply not worth it.

My Expectations: I expect that you will work hard in this course. I expect you to come to each class prepared to listen and understand. I expect that you will ask questions if things are not clear. I expect that you will use the textbook and other resources, and will read material as assigned. I expect you to attend class regularly, and that you will promptly catch up on any classes you miss. I expect you to make an honest attempt at assigned homework, and to ask for help when you need it. I expect you to behave appropriately and politely towards me and your fellow classmates at all times. This includes remaining quiet when others are speaking and being patient with the questions of others. I expect you not to misrepresent the work of others as your own, and to neither give nor receive unauthorized aid in examinations or homework.

Your Expectations: You can expect that I will work hard in this course. I will do my best to explain and illustrate the material in a way that makes sense to you. Sometimes I will need help and feedback from you in order to figure out the best way to explain something. I will listen to your questions with respect and never ridicule (although teasing is not out of the question); if the answer to your question is beyond the scope of this course, I would be happy to discuss it with you outside of class. I will give you fair notice of all assignments and tests and do my best to let you know what is required of you. I will attempt to evaluate your work fairly and assign grades appropriate to your performance. If you have other expectations, hopes, or suggestions, please let me know. I will do my best to make this course a success for all of us.

In the Event of a Major Campus Emergency: Course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Here are ways to get information about changes in this course: course web page, my email address and office phone.