Syllabus – Course Information and Policies
Statistics 5346/CS 5204 – Spring 2017
Regression Analysis

Instructor
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Office: 215 Rolla Building
Office Phone: 341-4913

Office Hours
9:00-10:30am Tues/Thurs or by appointment
I encourage you to visit me during my office hours if you have any questions about the course. If you cannot attend during the allotted times, please send me an email to schedule an appointment.

Class Times
Lectures: 2:00-3:15 pm, Tues/Thurs, Centennial Hall 105
I plan to begin and end each class promptly – please be on time. Cell-phones and other electronic devices should be turned off or placed on vibrate while in class. Brief on-topic questions during class are welcomed and encouraged.

Attendance
Excellent attendance is expected and important for keeping up with the course material. If you miss a lecture, it is your responsibility to catch up on the material that you missed. If a student has excessive unexcused absence (more than 3 classes) and/or is not performing well in the course, I may send an Academic Alert. With 6 or more absences, I reserve the option to drop the student from the course.

Canvas
Important information about the course will be available on the Canvas site for this course (http://canvas.mst.edu) Please check the course Canvas site regularly as it will be updated continuously throughout the semester!

Textbook
Applied Linear Regression Models, Revised Edition with Student CD, 4th Edition by Kutner, Nachtsheim, and Neter (Required)

Course Description
Simple linear regression, multiple regression, regression diagnostics, multicollinearity, measures of influence and leverage, model selection techniques, polynomial models, regression with autocorrelated errors, introduction to non-linear regression.

Prerequisites
Math 2222 and one of Stat 3111, 3113, 3115, 3117, or 5643.

Course Objectives
Statistical methods are abundantly used in studying relationships between variables. In regression analysis, we develop statistical models that depict relationships among variables and use them to make predictions based on these models. We also use these models for construction of appropriate confidence intervals and tests of hypotheses for parameters in the model and for predictions.
The learning outcomes for this course shall include but not be limited to the following:

1. To develop an in-depth working knowledge of statistical regression analysis, be able to make inferences and predictions by applying regression methods, and evaluate the fit and assumptions of regression models.
2. To properly apply regression methods to real world problems and be able to draw valid conclusions that are presented in a clear and concise manner.
3. To gain experience performing regression analyses in SAS.

**Course Topics**
This class covers the application and theory of statistical regression analysis. For the most part, we will follow the text material. These are the tentative topics I would like to cover, time permitting.

**Part One – Simple Linear Regression (SLR)**
Chapters 1–5 introduce the simple linear regression model with one predictor variable. Topics covered include: Least squares estimation, inferences on model parameters, predictions of new observations, model diagnostics and remedial measures, simultaneous inferences, and the matrix approach to simple linear regression.

**Part Two – Multiple Linear Regression (MLR)**
Chapters 6-11 introduce the multiple linear regression model with more than one predictor variable. Topics covered include: Least squares estimation, inferences on model parameters, predictions of new observations, diagnostics and remedial measures, extra sums of squares, multicollinearity, models with qualitative predictors, model selection and validation, and detection of outliers and influential points.

**Part Three – Other Types of Regression Analysis**
Time permitting, we will also cover chapters 12-14. Chapter 12 introduces regression with autocorrelated errors, Chapter 13 covers nonlinear regression, and Chapter 14 introduces logistic regression.

**Grading**
Your final grade will depend on the following components with these proportions:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>25%</td>
</tr>
<tr>
<td>Test 1</td>
<td>30%</td>
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<tr>
<td>Test 2</td>
<td>30%</td>
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<tr>
<td>Final Project</td>
<td>15%</td>
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</tbody>
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The percentage grades needed to achieve an A, B, C, or D will follow approximately the following scale: 90 – 100 = A, 80 – 89 = B, 70 – 79 = C, 60 – 69 = D, 0 – 59 = F. If you registered S/N a grade of C or higher is needed to earn an S. When assigning the final grade, I will consider class involvement and attendance in borderline cases. Class involvement means being involved in the learning process, for example, by asking questions when things are not clear or communicating with me in or outside of class.

**Homework**
There will be problem sets assigned almost every week. Homework will typically (but not always) be assigned on Thursdays and due the following Thursday, *at the beginning of class*. Please check the Canvas site for homework assignments and due dates. Grades and solutions to all assigned problems will be posted on the Canvas site after the due date. For fairness and clarity we have the following rules about homework:

1. **Late homework will not be accepted under any circumstances and will receive a score of zero.** To allow for situations beyond your control (e.g., illness, family emergencies), your *lowest homework score will be dropped*. If you know in advance that you will not be able to turn in the homework on the due date, please make arrangements with the instructor *prior to* the homework due date for submitting your assignment.
2. Some collaboration on homework is acceptable, and you are encouraged to discuss the homework with others in the class. However, the work you hand in must be your own. Direct copying of someone else's work is not acceptable, nor is misrepresenting the work of others as your own.

3. Homework solutions submitted for grading should be legible and neat. You must show your work. Both the correctness of the answer and the work you show are considered in grading. In most cases, it will be preferable for you to type your homework in Word or another word processing program, since it may require output from SAS. Use sentences and explain your work.

4. For each assignment, all or only a subset of problems may be graded, but the problems to be graded will NOT be announced in advance. The solutions to all problems will be posted after the assignment is due, so that you can check answers for problems that were not graded.

5. After receiving back your graded homework, check to make sure the grade recorded on Canvas is accurate. Let your instructor know within one week of receiving your assignment back if there is a discrepancy.

Exams
There will be two in class exams and a final project. The midterm exams are tentatively scheduled for the class periods on Thursday, February 23rd and Thursday, April 20th. The final project presentations will be tentatively be held during the last week of classes on Tuesday, May 2, and Thursday, May 4th. The final report will be due during the university’s finals week on the day of your regularly scheduled exam, Monday, May 8th, by 5pm.

Any changes to the exam dates will be announced at least one week in advance. All work on exams must be entirely your own and academic dishonesty will not be tolerated. It is just as dishonest to give help as to receive it.

In the event you must miss an exam for a university excused reason (e.g., participating in conference or sporting event), you must notify me by email at least one week prior to the exam and provide appropriate documentation in order to take a makeup exam that will be given prior to the in class exam. If you are missing the exam due to an emergency, you must email me with the details of your situation within 24 hours of the exam and follow up with appropriate documentation to make an alternative arrangement for missing the exam. Please note that airline schedules, planned family trips, or work do not constitute valid reasons to receive a makeup exam.

Class Project:
Students will complete a project involving a real data analysis. This will be a group project involving a written summary and a class presentation that will be given at the end of the semester. More information about the class project will be given throughout the semester.

Software:
SAS Software
Computations for a statistical data analysis are almost always performed with the help of a computer. There is widely used professional software package known as SAS that will be introduced in this course. It is expected that students will use this software in doing many of the homework assignments and the class project. SAS is available in Centennial 105. Distance students will have virtual access to SAS.

Sample SAS code will be given for examples done in class and posted to the class Canvas site.
An introductory SAS session will be held during the first few weeks of class. Information about this session will be given when it becomes available.

**JMP Software**
Although SAS will be the primary software used in the course, I may occasionally demonstrate some concepts in alternative statistical software called JMP. JMP is available in CH 105, CS 206, and Schrenk 140, as well as some other labs on campus.

**Other computer skills:**
I would like the results of data analysis problems to be typed into a document, with appropriate graphics incorporated. This will require a word processor. A portable scientific calculator will also be helpful to have in class, lab, and on exams.

**Distance Students**
Lectures will be recorded for distance students only and available in Media Space through the Video Communications Center (VCC: [https://vcc.mst.edu/](https://vcc.mst.edu/)). There will also be a link in Canvas for you to access this space. You will need to provide your user information to access the recorded lectures. You may join in the lecture live or watch the recorded lecture.

Details about turning in homework assignments will be given prior to the first due date. Assignments will either be emailed to the instructor or uploaded in Canvas by 2:00pm Central time on the due date. Word or PDF documents are acceptable. Information about SAS access will be provided.

Details about exams will be given at least one week prior to the first exam date. Exams will be proctored either through Examity online proctoring service or at an authorized testing center. There may be a small fee for this service. The instructor will work with each student individually to find an acceptable solution for taking exams.

**Disability Support Services**
It is the policy and practice of Missouri University of Science and Technology to promote inclusive learning environments. If you have a documented disability you may be eligible for reasonable accommodations in compliance with university policy, the Americans with Disabilities Act of 1990, the Americans with Disabilities Amendment Act (ADAAA) of 2008, and Section 504 of the Rehabilitation Act of 1973. Please note, students are not encouraged to negotiate accommodations directly with professors.

To request accommodations or assistance, please self-identify with Disability Support Services (DSS), 203 Norwood Hall. For more information or to register for services, contact DSS at (573) 341-6655 or by email at dss@mst.edu. Please note that I must receive a letter specifying the accommodation(s) you will need before I can arrange the accommodation(s).

**Academic Integrity**
Academic dishonesty is not tolerated and will be dealt with as specified in the Missouri S & T Student Academic Regulations policy. This policy is located online at the following address: [http://registrar.mst.edu/academicregs/index.html](http://registrar.mst.edu/academicregs/index.html). Academic dishonesty includes, but is not limited to cheating, plagiarism, or sabotage.

**Emergency Egress**
In case of an emergency, please familiarize yourself with the egress route for evacuation of our classroom and lab. Egress maps are found at: [http://designconstruction.mst.edu/floorplan/](http://designconstruction.mst.edu/floorplan/).

**Title IX Information**
Missouri University of Science and Technology is committed to the safety and well-being of all members of its community. US Federal Law Title IX states that no member of the university
community shall, on the basis of sex, be excluded from participation in, or be denied benefits of, or be subjected to discrimination under any education program or activity. Furthermore, in accordance with Title IX guidelines from the US Office of Civil Rights, Missouri S&T requires that all faculty and staff members report, to the Missouri S&T Title IX Coordinator, any notice of sexual harassment, abuse, and/or violence (including personal relational abuse, relational/domestic violence, and stalking) disclosed through communication including but not limited to direct conversation, email, social media, classroom papers and homework exercises.

Missouri S&T’s Title IX Coordinator is Vice Chancellor Shenethia Manuel. Contact her directly (manuels@mst.edu; (573) 341-4920; 113 Centennial Hall) to report Title IX violations. To learn more about Title IX resources and reporting options (confidential and non-confidential) available to Missouri S&T students, staff, and faculty, please visit http://titleix.mst.edu.

Changes to Syllabus
I reserve the right to make changes to this syllabus. Any such changes will be announced in class.

Have a great semester!