

	<b>Course</b>	<b>STAT 6337 Advanced Statistical Methods I</b>
	<b>Professor</b>	Swati Biswas
	<b>Term</b>	Fall 2016
	<b>Class Sessions</b>	MW 4:00 pm – 5:15 pm, FO 2.208

### Professor's Contact Information

<b>Office Location</b>	FO3.704K
<b>Email Address</b>	<a href="mailto:swati.biswas@utdallas.edu">swati.biswas@utdallas.edu</a>
<b>Office Phone</b>	(972) 883-6686 (email me instead of calling)
<b>Office Hours</b>	M 2:45 pm – 3:45 pm W 5:15 pm – 6:00 pm or by appointment
<b>Preferred Method of Contact</b>	Email
<b>Teaching Assistant, Email, Location, and Office Hours</b>	Francis Bilson Darku, <a href="mailto:fxb130230@utdallas.edu">fxb130230@utdallas.edu</a> , FO 1.204 Tuesday 10 – 11 am Thursday 4 – 5 pm

### General Course Information

<b>Course Website</b>	<a href="https://elearning.utdallas.edu">https://elearning.utdallas.edu</a> All course related materials will be posted here.
<b>Prerequisite</b>	STAT 5352 or STAT 6331 or equivalent
<b>Course Description (from catalog)</b>	Statistical methods most often used in the analysis of data. Univariate and multivariate statistics. P-values. Contingency tables. Simple and multiple regression. Model selection. Diagnostics and remedial measures. Analysis of residuals. Lack of fit. Ridge regression and multicollinearity. Influential data analysis. Categorical data and dummy variables. Nonlinear regression. Logistic regression. Data analysis using statistical software packages.
<b>Desired Learning Outcomes</b>	<ul style="list-style-type: none"> <li>• Derive analytically the methods used for analyzing data.</li> <li>• Use tools and techniques to graphically visualize data and check the underlying assumptions of methods.</li> <li>• Identify specific method required for analysis depending on the type of data at hand and the research problem posed.</li> <li>• Solve problems by hand (wherever possible) and describe the results.</li> <li>• Use computers to analyze data, interpret outputs, and summarize the results.</li> </ul>
<b>Required Text</b>	<i>Applied Linear Statistical Models</i> by Kutner, Nachtsheim, Neter, and Li, 5th edition, McGraw-Hill, 2004 (also to be used for STAT 6338 in Spring 2017). Note: The book is available in the library with Call Numbers <b>13527, 13528, 13529</b> .
<b>Recommended Texts</b>	<ul style="list-style-type: none"> <li>• <i>SAS and SPSS Program Solutions for Use With Applied Linear Statistical Models</i> by W. D. Johnson and W. H. Replogle</li> <li>• <i>A Step-by-Step Approach to Using the SAS System for Univariate and Multivariate Statistics</i> by L. Hatcher and E. Stepanski, SAS Publishing</li> </ul>

	<ul style="list-style-type: none"> <li>• <i>SAS OnlineDoc®</i>, Version 8 at <a href="http://www.okstate.edu/sas/v8/sashtml/main.htm">http://www.okstate.edu/sas/v8/sashtml/main.htm</a></li> </ul>
<b>Software</b>	<p>Statistical software SAS will be used. The following are the options for accessing SAS:</p> <ul style="list-style-type: none"> <li>• Founders/Brazos lab in FO 1.206 (windows version, free).</li> <li>• <i>SAS University Edition</i> (free) at <a href="http://www.sas.com/en_us/software/university-edition.html">http://www.sas.com/en_us/software/university-edition.html</a></li> <li>• On UTD server giant (free). Linux based. Need SSH or Putty (and Xming to get multiple windows) to connect.</li> <li>• Buy your own SAS through UT Austin store (\$75 for one year license from Sept 1 – Aug 31) at <a href="http://www.utexas.edu/its/products/sas/index.php">http://www.utexas.edu/its/products/sas/index.php</a></li> </ul>

### Course Schedule (Tentative)

Week	Date	Course Session Topic*	Chapter(s)
1-2	8/22 – 8/31	Distributions and parameters. Random samples and statistics. Normal distribution, $t$ , chi-square, $F$ . Sampling distributions. Confidence intervals. Hypotheses testing. P-value. Skewness, kurtosis, tests for normality. Introduction to SAS. DATA statement, PROC MEANS, UNIVARIATE, TTEST.	
2-3	8/31 – 9/7	Binomial and multinomial distributions. Tests for proportions. Contingency tables. SAS: PROC FREQ (TABLES).	
4-5	9/12 – 9/21	Linear regression: model, estimation, inference, prediction. Regression and correlation, $R^2$ . SAS: PROC REG, PLOT	1, 2
6-7	9/26 – 10/5	Regression diagnostics: nonnormality, nonlinearity, heteroscedasticity. Smoothed plots. SAS: PROC UNIVARIATE (NORMAL PLOT), REG (PAINT, REWEIGHT, REFIT). PROC MODEL. Simultaneous estimation. Other regression models.	3, 4
8-9	10/10 – 10/19	Multiple regression. Matrix approach. Analysis of variance. Analysis of residuals. Partial correlation. Multiple correlation coefficient. SAS: PROC REG, GLM, CORR.	5, 6
9	10/17	<b>Exam 1</b>	
10-11	10/24 – 11/2	Model building. Model selection and validation. Extra sum of squares. SAS: PROC REG (SELECTION), GLM.	7, 8
12	11/7 – 11/9	Regression diagnostics. Influential observations and outliers. Effect of collinearity. Robust regression. Ridge regression. SAS: PROC REG (COLLIN, TOL VIF).	9, 10
13	11/14 – 11/16	Symptoms and remedies. Transformation of variables. Missing data. Weighted Least Squares.	10, 11

14	11/21 – 11/23	<b>Fall Break – University Closed</b> <b>Thanksgiving Holiday – University Closed</b>	
15	11/28 – 11/30	Nonlinear relations, Logistic regression, Poisson regression, SAS:PROC NLIN	13, 14
16	12/5	Generalized linear models SAS: PROC GLM, PROC LOGISTIC	14
16	12/7	<b>Final Exam</b>	

\* Subject to change

## Course Policies

<b>Homework, Quizzes, Exams, and Projects</b>	<ul style="list-style-type: none"> <li>Homework will be assigned but will not be graded. The main purpose of homework is to give you practice in solving questions to help you prepare for quizzes, exams, and projects. The solutions will be provided.</li> <li>Quizzes will be given weekly.</li> <li>Quizzes and exams are closed notes and closed book. They will be based on homework, lecture notes, and material covered from the textbook. One 8.5" x 11" page with handwritten notes will be allowed for exams.</li> <li>Projects will involve analysis of data using SAS. A professional project report is expected (more details on format of report will be provided). The due dates will be announced in class.</li> </ul>
<b>Grading Criteria</b>	<ul style="list-style-type: none"> <li>Quizzes: 25%</li> <li>SAS Projects: 25%</li> <li>Exam 1: 25%</li> <li>Exam 2: 25%</li> </ul>
<b>Make-up Exams</b>	No make-up exam will be given unless there is a documented emergency.
<b>Extra Credit</b>	No extra credit work will be assigned.
<b>Classroom Citizenship</b>	You are encouraged to ask questions and participate in discussions in the class. Also, you can post questions and answers on eLearning.
<b>Class Attendance</b>	Attendance is required. If you have to miss a class, please try to inform me in advance and arrange to obtain the missed material from your classmates. I am happy to help in any way I can.
<b>UT Dallas Syllabus Policies and Procedures</b>	<p>The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.</p> <p>Please go to <a href="http://go.utdallas.edu/syllabus-policies">http://go.utdallas.edu/syllabus-policies</a> for these policies.</p>

*The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.*