INFO 5081     Research Design and Analysis  
CREDIT HOURS:  3
COURSE SYLLABUS – FALL 2016
Mondays 5:30pm to 8:20pm
Discovery Park   NTDP B140

COURSE INSTRUCTOR
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COURSE PREREQUISITES: Any basic algebra or statistics undergraduate course

CLASS Blackboard Site: https://learn.unt.edu/

Course description
The course emphasizes on concepts of research design, data analysis, and fosters active learning of statistical applications. This is an introductory course in applied data analysis that is recommended to be taken during the first year of the graduate program. This course covers basic techniques of applied statistical analysis beginning with an exploration of the meaning of data followed by methods of describing data on individual variables and examining association between variables. These techniques include estimation, tests of mean differences, differences in distributions, and regression. Sampling and probability concepts are also introduced as a basis for understanding how to infer results from samples to the populations from which they are drawn. Students will use SPSS statistical software package to conduct data analysis, learn to interpret, and communicate statistical results scientifically. This course will enhance student perceptions of the vitality and importance of statistics in arriving at scientific evidence in support of the study conclusions. The course may serve a much broader audience and techniques learned in this course can be applied in a wide variety of social science fields including health.

Course Student Learning Objectives:

1. Understand basic research designs, types of variables, summarizing and presenting data.
2. Perform data visualization and analysis including measures of central tendency, measures of variation, and analysis of variance.
3. Apply basic statistical techniques to analyze data and understand the effects of sample size on results.
4. Use methods of inferential statistics including hypothesis testing, confidence interval evaluation.
5. Identify the type of data and select appropriate statistical tests.
6. Learn to create databases, data entry, data manipulation, and analysis.

Instructional Methods:
This course is taught using a variety of instructional methods including lectures, discussions classroom individual/group activities. The class will use of SPSS statistical software to conduct data analyses.

Communication method: email preferred.

Email Accounts: All students must have a valid UNT email account. Note that any communication with the class will be done using your UNT email account.
Important Dates:  http://registrar.unt.edu/registration/fall-registration-guide

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>August 29, 2016</td>
<td>First Class Day (Monday)</td>
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<tr>
<td>September 5, 2016</td>
<td>Labor Day (no classes; university closed)</td>
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<tr>
<td>November 24-27, 2016</td>
<td>Thanksgiving Break (no classes; university closed)</td>
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<td>December 6, 2016</td>
<td>Last Class Day</td>
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<td>December 10-15, 2016</td>
<td>Finals</td>
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Textbook and Materials:

Main Textbook: Make sure this is 8th ed.
Title: Introduction to the Practice of Statistics: 8th ed. w/CrunchIt/EESEE Access Card
Author: David S. Moore, George P. McCabe, Bruce Craig ISBN:9781464158933

Supplementary reading & other reference books on SPSS:
3. IBM SPSS Statistics 22 Brief Guide (pdf copy on the blackboard)
4. IBM SPSS Statistics 22 Core System User’s Guide (pdf copy on the blackboard)

Course Weekly Schedule

<table>
<thead>
<tr>
<th>Class</th>
<th>Date</th>
<th>Topic</th>
<th>Readings/Activity</th>
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<tbody>
<tr>
<td>1</td>
<td>8/29</td>
<td>Introduction to research designs and statistics; What’s involved in the analysis? data collection/data sources; Types of variables</td>
<td>Chpt. 3</td>
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<tr>
<td>2</td>
<td>9/12</td>
<td>How do we obtain data? Study designs; experimental design; Sampling;</td>
<td>Chpt. 3 pp167-228 Class activity –</td>
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<tr>
<td>3</td>
<td>9/19</td>
<td>Designing a survey and Sampling; sample size Descriptive statistics-summarization/visualization of data using graphics &amp; statistics-mean, median, mode, variance, standard dev. Using a single variable (univariate); Normal distribution; data transformation; standardization; z-scores</td>
<td>Chpt. 3 continued Class activity –</td>
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<tr>
<td>4</td>
<td>9/26</td>
<td>Exploring relationships – bi-variate associations- association; correlation; scatter plot; Two-way tables for categorical variables</td>
<td>Chpt. 2; pp 81-109; 139-157; Class activity –</td>
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<tr>
<td>5</td>
<td>10/3</td>
<td>Statistical Inference; Tests of significance- Hypothesis testing; Calculating Confidence Intervals;; Tests for differences - one sample &amp; two sample t-tests</td>
<td>Chpt. 1; Class activity – HW 1 due</td>
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<tr>
<td>6</td>
<td>10/10</td>
<td>Statistical Inference; Tests of significance- Hypothesis testing; Calculating Confidence Intervals;; Tests for differences - one sample &amp; two sample t-tests</td>
<td>Chpt. 6; TEST 1</td>
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<tr>
<td>7</td>
<td>10/17</td>
<td>Inference for distributions; Comparing two means; t-tests; two-sample unpaired; paired sample continuous data - Kolmogorov–Smirnov test for normality</td>
<td>Chpt. 7; Class activity –</td>
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<tr>
<td>8</td>
<td>10/24</td>
<td>Inference for proportions; Testing proportions</td>
<td>Chpt. 8 Class activity –</td>
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<tr>
<td>9</td>
<td>10/31</td>
<td>Analysis of Two-way tables; Goodness of fit</td>
<td>Chpt. 9; Class activity –</td>
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<tr>
<td>10</td>
<td>11/7</td>
<td>Analysis of Two-way tables; Goodness of fit</td>
<td>Chpt. 9; Class activity – TEST 2</td>
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<tr>
<td>11</td>
<td>11/14</td>
<td>Introduction to regression Simple linear regression; Multiple regression</td>
<td>Chpt.2 pp109-137; Chpt. 10 &amp; 11</td>
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INFO5081: Fall 2016

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<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Class activity</th>
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<tr>
<td>12</td>
<td>11/21</td>
<td>Logistic Regression</td>
<td>Class activity – Chpt. 14</td>
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<tr>
<td>13</td>
<td>11/28</td>
<td>Analysis of variance: one-way ANOVA/Two-way</td>
<td>Chpt. 12 &amp; 13</td>
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<td>Repeated-measures ANOVA; Multiple comparison/correction</td>
<td>Class activity –</td>
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<td>Bonferroni; Test of homogeneity</td>
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<tr>
<td>14</td>
<td>12/5</td>
<td>Analysis of variance: one-way ANOVA/Two-way</td>
<td>Chpt. 12 &amp; 13</td>
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<td>Repeated-measures ANOVA; Multiple comparison/correction</td>
<td>Class activity –</td>
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<td>Bonferroni; Test of homogeneity</td>
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<td>15</td>
<td>12/7</td>
<td>Relating One Variable to Another-categorical data, The Chi-Squared</td>
<td>Chpt. 15</td>
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<td>Goodness-of-Fit Test; non-parametric tests- Wilcoxon; Two Groups:</td>
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<td>Mann–Whitney Test; More than Two Groups: Kruskal–Wallis test and</td>
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<td>Mann–Whitney U test; Cochran–Manitl–Haenszel test for repeated</td>
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<td>tests of independence Two Quantitative Variables: Spearman’s Rank</td>
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<td>Correlation; Pearson correlation; Kendall rank-order correlation</td>
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<tr>
<td>16</td>
<td>12/12</td>
<td>Final project- Presentation/submission</td>
<td>TEST 3</td>
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Note: Excluded: Probability & Distribution; Sampling distributions Chpt. 4 & 5;
Video site: strongly encouraged to watch: Against All Odds (AAO) Video programs and numbers: [web site and more detailed descriptions](http://www.learner.org/resources/resource.html?uid=65)
A video series on introductory statistics, Against All Odds (AAO) can be found at Annenberg Foundation Web site. The web address is: [http://www.learner.org/resources/resource.html?uid=65](http://www.learner.org/resources/resource.html?uid=65). AAO video viewing is not required. however, it may help you in learning the subject.

1: What is statistics?
2: Picturing distributions
3: Describing distributions
4: Normal distributions
5: Normal calculations
6: Time series
7: Models for growth
8: Describing relationships
9: Correlation
10: Multidimensional data analysis
11: The question of causation
12: Experimental design
13: Blocking and sampling
14: Samples and surveys
15: What is probability?
16: Random variables
17: Binomial distributions
18: The sample mean and control charts
19: Confidence intervals
20: Significance Tests
21: Inference for one mean
22: Comparing two means
23: Inference for proportions
24: Inference for two-way tables
25: Inference for relationships
26: Case study

Course Assessment:
- **Assignments/classwork:** 15%
  
  *Homework or classwork.* In order to learn the subject such as statistics, you have to do problems. Problems/examples will be supplied for selected topics. It is **strongly recommended** that you do as many problem sets as possible, including unassigned problems. The review questions and exercises at the end of each chapter in the textbook are excellent for the purpose of practicing statistics and preparing for exams. **Students are expected to submit assigned classwork by deadlines. Late submission will result in a penalty.**

- **3 Tests:** 60% of the total grade
  
  Students must take all exams on the scheduled days. If, due to an emergency, it is not possible to take the test as scheduled, the student must send a message by e-mail stating that she/he will not take the test on that day providing the reason for absence. Only a note from a physician constitutes acceptable grounds for the absence. Telephone calls or email must be received by NOON on the day of the scheduled test.

- **Final Project:** 25% of the grade
  
  This final project involves the use of a secondary data set, formulating study objectives, conducting analyses based on the objectives including univariate, bivariate, and regression analyses. A final report describing the results must be submitted. Data sets will be provided to you (e.g., Youth Risk Behavior Survey, Behavioral Risk Factor Survey) or you may also find your own data sets depending on your topic of interest. **Detailed instructions for the analyses and final written report will be available at a later date.**
Final Course Grading Criteria:  
A= 90-100; B=80-89;  
C= 70-79;  
D= 60-69;  
F <60

Attendance Policy: Attendance at all class sessions and participation is expected. Students are expected to arrive on time and be respectful of other students. Students are responsible for informing the instructor in advance or in a timely manner of the reasons for their absence. Typically excused absences include illness, bereavement or religious observances. Serious tardiness may be dealt with at the discretion of the instructor.

Observance of a religious holiday is to be considered an excused absence from class for any student. If a student misses a scheduled examination or other announced assignment because of observance of a religious holiday, the student and instructor shall agree upon a mutually convenient time as an alternate date for completion of the assignment.

Penalties for Late Work
Students are expected to complete the work assigned and submit on or before the set due date. There will be a penalty for late submission at the discretion of the instructor.

Make-up exam will only be given to students who miss an exam due to an extreme emergency and has notified the instructor within 24 hours after the exam, or a sufficient time period before the exam. The student will be expected to provide verification, such as signed statement and phone number, to verify the reason for his or her absence from the exam.

IMPORTANT UNIVERSITY POLICIES:
Academic Integrity

Academic dishonesty in any form, written or non-written, media or technology, seriously compromises the mission of UNT University to provide quality programs and opportunities for the optimum development of all students.

Academic integrity is the obligation of all UNT students. It ensures the application of the highest academic standards and principles of conduct, honesty and truth. An individual’s work must reflect that person’s own efforts and achievements. Any collaboration of effort by an individual or groups of individuals must be acknowledged. Failure to acknowledge such contributions constitutes an act of dishonesty and a misrepresentation of the individual’s work.

The University maintains that all students are expected to employ the highest standards of academic integrity in their coursework. Any violation of such may be subject to a penalty based on the infraction which may include a reprimand, reduction in grade, failing grade, or suspension or dismissal from the University. Anyone needing more information should consult the UNT University Academic Integrity Policy.