RMTD 404
Introduction to Educational Statistics
(Fall 2017)

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Office: Lewis Towers, Room 1136
Office hour: By appointment

Course Description
This course provides an introduction to data analysis and statistical inference. Specially, students learn to:

● describe data (quantitatively and graphically)
● formulate research hypothesis and conduct hypothesis tests
● select and compute statistical estimates
● use computer packages to accomplish these tasks
● interpret and write about the results of the estimates and tests
● make sure that all conclusions are justified given the results

Knowledge of basic algebra is required, as is an understanding of the fundamental principles of descriptive statistics and hypotheses; knowledge of higher mathematics (e.g., trigonometry, calculus) is not required.

Required Text

Recommended Text (Only need one—The first option is online and free; the second option is for those who prefer to have a physical book as a resource)


OR

**Technological Knowledge and Skills**

Students will use SPSS (Statistical Package for the Social Sciences) to analyze data using NELS (National Education Longitudinal Study) dataset in this class. NELS is one of the largest and most important datasets collected by the U.S. government, including extensive measurements of students’ beliefs, aspirations, attitudes, and background, as well as related information from teachers, parents, and schools. Students are expected to be able to graphically summarize data (e.g., using histograms) and perform hypothesis tests (e.g., t-tests, chi-square tests, and regression).

Access to SPSS—Most of the computers on Water Towers Campus are equipped with the latest version of SPSS. For home use, you can purchase or rent the SPSS Graduate Package. More information can be found in the section “IBM SPSS Statistics 24” under the STUDENT HOME USE section in: [http://www.luc.edu/itrs/researchcomputing/home-use.shtml](http://www.luc.edu/itrs/researchcomputing/home-use.shtml). For the purposes of this class, the “IBM SPSS Statistics Base GradPack” versions 20 and higher will suffice.

**Required Familiarity**

- Be able to download and upload files
- Be able to use Microsoft Office Package, especially Microsoft Word and Microsoft PowerPoint

**Evaluation**

Grades will be based on points accumulated on the homework and examinations. There will be 100 total possible points, distributed as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework assignments</td>
<td>60%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>20%</td>
</tr>
<tr>
<td>Final exam (scheduled time only)</td>
<td>20%</td>
</tr>
</tbody>
</table>

The grade ranges in terms of percentages are:

- 100.0-92.0 = A
- 87.9-84.0 = B+
- 74.9-72.0 = C+
- 64.9 and below = F

- 91.9-88.0 = A−
- 83.9-80.0 = B
- 71.9-70.0 = C
- 69.9-65.0 = C−

**Homework**

Six homework assignments will make up the points devoted to homework. The assignments are not all equal in length. Total homework points will be converted to a percentage score, then weighted and combined with exam scores to obtain a final overall grade. You are encouraged to discuss the homework assignments with other students in the class, but each student must separately write up her or his own answers and turn and turn in a copy by the due date. All homework should be uploaded into your Sakai account.

Please keep in mind the due dates for all assignments. Assignments turned in within one week of the due date will at most be worth half the original total points unless prior arrangements have been made with instructor. Assignments turned in after one week of the due date will not receive any points.
If you would like to appeal any grade after your HW is graded, you must make the appeal in writing and submit it along with the graded HW to the instructor.

**Examinations**
There are be two exams for this course. Exam 1 is a take-home exam (you will be expected to work on the exam by yourself). The final exam is an in-class exam (on the last day of class). The exams are open book and open notes, and you may use calculators during the exam. However, books, notes, and calculators may not be shared or circulated during exams, so be sure to bring your own materials.

**Attendance**
Regular attendance, attending class on time, and participation in class discussions are expected. You may not miss more than two classes.

**Electronic Communication Policies and Guidelines**
The School of Education faculty, students and staff respect each other’s rights, privacy and access to electronic resources, services, and communications while in the pursuit of academic and professional growth, networking and research. All members of the university community are expected to demonstrate the highest standards of integrity, communication, and responsibility while accessing and utilizing technology, information resources, and computing facilities. A link to the Loyola University Chicago and School of Education official policies and guidelines can be found at: [http://www.luc.edu/media/lucedu/education/pdfs/SOE_Cyberbullying_Policy.pdf](http://www.luc.edu/media/lucedu/education/pdfs/SOE_Cyberbullying_Policy.pdf)

**School of Education Conceptual Framework**
Our School’s Conceptual Framework – *Social Action through Education* – guides the curricula of School of Education programs in the preparation of carrying out the mission of social justice. These dimensions of the conceptual framework also serve as the foundation to the School of Education – standards that are explicitly embedded in major benchmarks across all SOE programs. Our conceptual framework is described here: [www.luc.edu/education/mission/](http://www.luc.edu/education/mission/). Social inequities exist for many subgroups within the population (including but not limited to subgroups based on race, gender, sexual orientation, social class, ethnicity, and ability). This course will help students develop the foundational knowledge needed to carry out quantitative research that could offset social inequities that exist in our society for one, some, or all groups.

**IDEA Objectives**
IDEA is an evaluation system that our School uses to assess whether a class reaches its major goals by the end of the semester. The essential objectives for this course are:

1. Gaining a basic understanding of the subject (e.g., factual knowledge, methods, principles, generalizations, theories)
2. Learning to apply course material (to improve thinking, problem solving, and decisions)
3. Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course
4. Learning appropriate methods for collecting, analyzing, and interpreting numerical information

Loyola University Chicago
School of Education
Syllabus Addendum

IDEA Course Evaluation Link for Students
Each course you take in the School of Education is evaluated through the IDEA Campus Labs system. We ask that when you receive an email alerting you that the evaluation is available that you promptly complete it. To learn more about IDEA or to access the website directly to complete your course evaluation go to: http://luc.edu/idea/ and click on STUDENT IDEA LOGIN on the left hand side of the page.

Dispositions
All students are assessed on one or more dispositional areas of growth across our programs: Professionalism, Inquiry, and Social Justice. The instructor in your course will identify the dispositions assessed in this course and you can find the rubrics related to these dispositions in LiveText. For those students in non-degree programs, the rubric for dispositions may be available through Sakai, TaskStream or another platform. Disposition data is reviewed by program faculty on a regular basis. This allows faculty to work with students to develop throughout their program and address any issues as they arise.

LiveText
All students, except those who are non-degree, must have access to LiveText to complete the benchmark assessments aligned to the Conceptual Framework Standards and all other accreditation, school-wide and/or program-wide related assessments. You can access more information on LiveText here: LiveText.

Syllabus Addendum Link

- www.luc.edu/education/syllabus-addendum/

This link directs students to statements on essential policies regarding academic honesty, accessibility, ethics line reporting and electronic communication policies and guidelines. We ask that you read each policy carefully.

This link will also bring you to the full text of our conceptual framework that guides the work of the School of Education – Social Action through Education.
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
<th>Slide #</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/29</td>
<td>Introduction &amp; Scales of measurement</td>
<td>Ch. 1</td>
<td>1,2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>9/5</td>
<td>Describing data</td>
<td>Ch. 2</td>
<td>3,4</td>
<td></td>
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<tr>
<td>3</td>
<td>9/12</td>
<td>• Transforming scores</td>
<td>Ch. 2</td>
<td>5</td>
<td>HW1</td>
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<tr>
<td></td>
<td></td>
<td>• Normal distribution</td>
<td>Ch. 3</td>
<td>6</td>
<td></td>
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<tr>
<td>4</td>
<td>9/19</td>
<td>Hypothesis testing</td>
<td>Ch. 4</td>
<td>7</td>
<td></td>
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<tr>
<td>5</td>
<td>9/26</td>
<td>Sampling distribution and Hypothesis testing applied to means: Variance known (z-test)</td>
<td>Ch. 7</td>
<td>8,9</td>
<td></td>
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<tr>
<td>6</td>
<td>10/3</td>
<td>Hypothesis testing applied to means: one-sample $t$-test (Testing a sample mean when $\sigma$ is unknown)</td>
<td>Ch. 7</td>
<td>10</td>
<td>HW2</td>
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<tr>
<td>7</td>
<td>10/10</td>
<td>~ ~ ~ ~ Fall Break -- No Class ~ ~ ~ ~</td>
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<tr>
<td>8</td>
<td>10/17</td>
<td>Hypothesis testing applied to means: one-sample $t$-test (Two matched samples)</td>
<td>Ch. 7</td>
<td>11</td>
<td>HW3</td>
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<td>9</td>
<td>10/24</td>
<td>~ ~ ~ ~ Exam 1 ~ ~ ~ ~</td>
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<tr>
<td>10</td>
<td>10/31</td>
<td>• Hypothesis testing applied to means: Variance unknown (two-sample $t$-test)</td>
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<td>12</td>
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<td>• Power</td>
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<tr>
<td>11</td>
<td>11/7</td>
<td>Correlation</td>
<td>Ch. 7</td>
<td>13</td>
<td>HW4</td>
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<tr>
<td>12</td>
<td>11/14</td>
<td>Simple linear regression I</td>
<td>Ch. 9</td>
<td>14</td>
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<tr>
<td>13</td>
<td>11/21</td>
<td>Simple linear regression II</td>
<td>Ch. 9</td>
<td>15</td>
<td>HW5</td>
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<tr>
<td>14</td>
<td>11/28</td>
<td>Chi-square I</td>
<td>Ch. 9</td>
<td>16 &amp; 17</td>
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<td>15</td>
<td>12/5</td>
<td>Chi-square II</td>
<td>Ch. 6</td>
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<td>HW6</td>
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<tr>
<td>16</td>
<td>12/12</td>
<td>~ ~ ~ ~ Exam 2 ~ ~ ~ ~</td>
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Evaluation of Disposition in RMTD 404

Rubric

<table>
<thead>
<tr>
<th>Area</th>
<th>Target</th>
<th>Acceptable</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Systematic Inquiry</strong></td>
<td>Candidate communicates effectively and appropriately with faculty and peers.</td>
<td>Candidate is working on communicating effectively and appropriately with faculty and peers.</td>
<td>Candidate is unable to communicate effectively and appropriately with faculty and peers.</td>
</tr>
<tr>
<td><strong>Responsibilities for General and Public Welfare</strong></td>
<td>Candidate’s written work is appropriate and effective for the course.</td>
<td>Candidate’s written work is sometimes appropriate and effective for the course.</td>
<td>Candidate’s written work is inappropriate and ineffective for the course.</td>
</tr>
<tr>
<td><strong>Timeliness</strong></td>
<td>Candidate is able to meet all deadlines.</td>
<td>Candidate is sometimes able to meet all deadlines.</td>
<td>Candidate is unable to meet all deadlines.</td>
</tr>
<tr>
<td><strong>Integrity/Honesty</strong></td>
<td>Candidate appropriately represents procedures, data, and findings – attempting to prevent misuse of their results.</td>
<td>Candidate represents procedures, data, and findings in a manner that is likely to allow the misuse of their results.</td>
<td>Candidate misrepresents procedures, data, and findings. There is minimal attempt to prevent misuse of their results.</td>
</tr>
</tbody>
</table>
