Course **GST 200: Quantitative Reasoning.** Obtaining a Pass or at least a 2.0 satisfies the Quantitative Foundation (QF) and Application (QA) graduation skill requirements.

**Approach** This course is an on-line course. All homework, chapter quizzes and essay analysis are done online. There is no class attendance required for this class. Moodle forums will be used to discuss student questions, issues and problems.

**Course Goal:** To help students read and interpret the summary statistics found in tables, graphs, statements, survey and studies. Students will analyze news stories that use summary statistics as evidence for causal connections. Students will learn how to distinguish stronger evidence from weaker evidence.

**Essay Analysis** Analyzing articles from the media is a key component of statistical literacy. This involves understanding the context – the ability of different study designs, ratios and statistical comparisons to ward off the influence of plausible confounders.

**Schedule**
- $1,675 per full-credit course online (1.0 credit). $770 fee for audit (0.0 credit)
- 4/19: Augsburg student registration opens online.
- 4/30: Walk-in and distance (fax) registrations processed.
- May 17: Classes begin. Last day for registration without a late fee.
- May 21: Last day for registration with a $100 late fee.
- July 2\textsuperscript{nd}: Classes end.

**Instructor** Milo Schield, 612-330-1153, Memorial 314 Schield@augsburg.edu

**Student commitments** To check Augsburg e-mail daily for any updates. To do all homework, forum posts and Odyssey challenges by the date/time due. This is a homework intensive class.

**Data Analysis** Students will analyze survey data based on their survey questionnaire.

**Grade Components**
- 25\% for Moodle homework (5 chapters; 5\% each). Online, untimed
- 25\% for Moodle quizzes (Five quizzes at 5\% each). Online, timed, 1 try
- 25\% based on your cumulative Odyssey power at end of the course. Online
- 15\% Final analysis of statistics in news stories and reports. Online. Comment on Causation, Association, Context, Assembly, Randomness and Error/Bias
- 10\% Final. Ch. 1-4. Online

**Course Mathematics Quiz & Test**
- All homework and quizzes are on-line in Moodle.
- Math level is arithmetic and algebra I.
- Quizzes and final are on-line: open book but timed.
Class Schedule

<table>
<thead>
<tr>
<th>#</th>
<th>Date</th>
<th>ACTIVITIES: Textbook</th>
<th>Text/Moodle Assign</th>
<th>Quiz</th>
<th>Odyssey</th>
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<tbody>
<tr>
<td>0</td>
<td>5/23</td>
<td>Due: Complete pre-course surveys</td>
<td>Moodle C0X</td>
<td></td>
<td>Intro</td>
</tr>
<tr>
<td>1</td>
<td>5/24</td>
<td>Assign: Ch 1 Statistical Literacy</td>
<td>Text: Entire chapter</td>
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<tr>
<td>2</td>
<td>5/30</td>
<td>Due Sunday: Chapter 1</td>
<td>Moodle Chapter 1</td>
<td>Intro (more)</td>
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<tr>
<td>3</td>
<td>5/31</td>
<td>Assign Ch 2 Take Care.</td>
<td>Text: Entire chapter</td>
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<tr>
<td>4</td>
<td>6/06</td>
<td>Due Sunday: Chapter 2</td>
<td>Moodle Chapter 2</td>
<td>Qz 1</td>
<td>Chapter 1</td>
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<tr>
<td>5</td>
<td>6/07</td>
<td>Assign Ch 3 Measures/Standardizing</td>
<td>Text: P. 113-158</td>
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<tr>
<td>6</td>
<td>6/13</td>
<td>Due Sunday: Chapter 3</td>
<td>Moodle Chapter 3</td>
<td>Qz 2</td>
<td>Chapter 2</td>
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<tr>
<td>7</td>
<td>6/14</td>
<td>Ch 4 Percents &amp; percentages: tables</td>
<td>Text: P. 187-211</td>
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<tr>
<td>8</td>
<td>6/20</td>
<td>Due Sunday: Chapter 4</td>
<td>Moodle Chapter 4</td>
<td>Qz 3</td>
<td>Chapter 3</td>
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<tr>
<td>9</td>
<td>6/21</td>
<td>Ch 5Attributed &amp; Likely compares</td>
<td>P. 239-249, 257-265</td>
<td></td>
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<tr>
<td>10</td>
<td>6/27</td>
<td>Due Sunday: Chapter 5</td>
<td>Moodle Chapter 5</td>
<td>Qz 4</td>
<td>Chapter 4</td>
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<td>11</td>
<td>6/28</td>
<td>Final review: Ch 1-5, Essays reviews</td>
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<tr>
<td>12</td>
<td>7/04</td>
<td>Due Sunday Final Ch 1-4</td>
<td>Qz 5</td>
<td>Summary</td>
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ODYSSEY OVERVIEW

This class uses a new on-line multiplayer game called “Odyssey” involving a number of challenges. In participating you gain “Power”. For more details on Odyssey, see the Odyssey Introduction in Moodle.

MOODLE

Moodle is an online course management system. It contains your assignments, resources and your grade book. Moodle assignments are of two kinds: exercises and quizzes. For details, see the next page. Moodle also contains a forum. Anyone in the class can post a question or comment in the forum. Anyone can respond to a question or comment. The Moodle forum is our primary means of communication.

APPROACH TO ONLINE COURSE EACH WEEK

Doing well in an online course takes discipline. It is all too easy to procrastinate and get behind. Follow these steps initially and then modify them as needed for your situation. Estimated time: 8 hrs/wk.

1. Mon 20 (after first chapter): Review results of previous week’s exercises posted in Moodle.
2. Mon 60 (after first chapter): Take the chapter quiz on the previous week’s assignment.
3. Tues 20 Odyssey: craft and post your response to each challenge.
4. Tues 15 Odyssey: Post required reviews on other responses so your response is accepted.
5. Tues 5 Check your syllabus for the material is assigned for the next week.
6. Tues 20 Text: **Scan through chapter** pictures, graphs, tables and examples.
8. Tues 5 Moodle: Check assignments to see what topics/pages are covered.
9. Wed 90 Text: **Read JUST those parts of the chapter involving the Moodle exercises**.
10. Thurs 90 Moodle: Make one try on each of the Moodle exercises
11. Thurs 5 Moodle Grade book: See which topics you need to review in the chapter.
12. Fri 15 Text: Review those chapter topics needed to improve your Moodle scores.
13. Fri 45 Odyssey: Return to critique the reviews and critiques of others.
14. Sa-Su 45 Moodle: Complete your second try on your Moodle exercises.
15. Sa-Su 45 Odyssey: Return again to critique the reviews and critiques of others.
16. Sun Complete each week’s work by 6 PM (CST).
Moodle exercises each focus on a single topic. Almost all are multiple choice exercises. A few involve single sentence responses. These online exercises give students immediate feedback on how well they know the associated materials. Each exercise typically has 10 questions each so students can complete a set in 5 to 15 minutes. Typically a student has two tries. After the first try Moodle displays which questions were missed. Students can then review the book to see what they were doing wrong. Then they have a second try. The system records their highest score. Moodle exercises are excellent review for the chapter quizzes since the chapter quizzes are based on these exercises.

Moodle quizzes cover the topics in a single chapter. Like the exercises, the quizzes are mainly multiple choice questions with a few one-sentence essay answers. Unlike the exercises, the Moodle quizzes are timed and give the student only one try. Moodle does not identify which questions were missed until the quiz is closed.

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<tr>
<th>ID</th>
<th>Pages</th>
<th>CHAPTER 1: STATISTICAL LITERACY</th>
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<tbody>
<tr>
<td>C1F</td>
<td>21-25</td>
<td>Distinguish Association-Causation in time-independent studies</td>
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<tr>
<td>C1G</td>
<td>21-25</td>
<td>Distinguish Association-Causation in time-based studies</td>
</tr>
<tr>
<td>C1H</td>
<td>21-25</td>
<td>Distinguish Association-causation: Likely/risk can expect</td>
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<tr>
<td>C1J</td>
<td>42-46</td>
<td>Identify which definition gives a higher count or total</td>
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<tr>
<td>C1K</td>
<td>42-46</td>
<td>Calculate effect of grouping on counts</td>
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<tr>
<td>C1L</td>
<td>24-25</td>
<td>Distinguish causal phrases</td>
</tr>
<tr>
<td>C1P</td>
<td>42-46</td>
<td>Calculate the influence of grouping on counts</td>
</tr>
<tr>
<td>C1Q</td>
<td>42-46</td>
<td>Impact of word change on number</td>
</tr>
<tr>
<td>C1R</td>
<td>42-46</td>
<td>Re-define groups to increase (decrease) number</td>
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<tr>
<td>C1V</td>
<td>52-53</td>
<td>Distinguish major types of error or bias</td>
</tr>
<tr>
<td>C1X</td>
<td>33-53</td>
<td>Distinguish Context, Assembly, Randomness or Error (p. 16)</td>
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<tr>
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<th>CHAPTER 2: TAKE CARE</th>
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<tr>
<td>C2A</td>
<td>Identify compare given type, test and base (incl. %pt)</td>
</tr>
<tr>
<td>C2B</td>
<td>Identify type comparison given full compare (incl. %pt)</td>
</tr>
<tr>
<td>C2C</td>
<td>Calculate size of comparison given test, base and compare grammar</td>
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<tr>
<td>C2D</td>
<td>Identify compare given test, base and size (Incl. %pt)</td>
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<tr>
<td>C2E</td>
<td>Compare percentages and rates (Incl. %pt)</td>
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<tr>
<td>C2F</td>
<td>Identify biggest comparison of two numbers</td>
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<tr>
<td>C2G</td>
<td>Calculate test or base given opposite and compare (Incl. %pt)</td>
</tr>
<tr>
<td>C2H</td>
<td>Compare test and base after scaling (Incl. %pt)</td>
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<tr>
<td>C2I</td>
<td>Calculate effect of definitions on averages</td>
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<tr>
<td>C2J</td>
<td>Distinguish Longitudinal vs. cross-sectional association</td>
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<tr>
<td>C2K</td>
<td>Distinguish longitudinal cohort from non-cohort</td>
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<tr>
<td>C2L</td>
<td>Distinguish Experiment vs. observational</td>
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<tr>
<td>C2M</td>
<td>Distinguish Controlled vs. uncontrolled</td>
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<tr>
<td>C2N</td>
<td>Distinguish Longitudinal vs. cross-sectional association (cohort vs non)</td>
</tr>
<tr>
<td>C2O</td>
<td>Randomness: Meaning of Statistical Significance</td>
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<tr>
<td>C2P</td>
<td>Randomness Determine statistical significance from ME</td>
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<tr>
<td>C2Q</td>
<td>If bias is created or eliminated, identify which type of bias.</td>
</tr>
<tr>
<td>C2R</td>
<td>Write re-definitions to increase/decrease count</td>
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<tr>
<td>C2S</td>
<td>Compare random assignment and random selection</td>
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<tr>
<td>C2T</td>
<td>Longitudinal: controlled vs. uncontrolled.</td>
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<tr>
<td>C2U</td>
<td>Which type of study is stronger?</td>
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<tr>
<td>C2V</td>
<td>Calculate % point difference given rate and % chg</td>
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<tr>
<td>C2W</td>
<td>Calculate %chg given rate and PctgPtDiff</td>
</tr>
<tr>
<td>C2X</td>
<td>Calc test &amp; base given %chg and PctgPtDiff</td>
</tr>
<tr>
<td>ID</td>
<td>CHAPTER 3: MEASUREMENTS</td>
</tr>
<tr>
<td>-----</td>
<td>--------------------------------------------------------------------------</td>
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<tr>
<td>C2Y</td>
<td>Write out different types of comparisons</td>
</tr>
<tr>
<td>C3A</td>
<td>Calculate &amp; compare ranks from scores</td>
</tr>
<tr>
<td>C3C</td>
<td>Identify which percentile, score or rank is higher</td>
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<tr>
<td>C3D</td>
<td>Identify which mean is higher in closely related groups</td>
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<tr>
<td>C3E</td>
<td>Compare averages from extremes of a distribution</td>
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<td>C3F</td>
<td>Calculate weighted average given subgroup averages</td>
</tr>
<tr>
<td>C3G</td>
<td>Calculate mean, median &amp; mode given data values</td>
</tr>
<tr>
<td>C3H</td>
<td>Calculate/compare weighted average before/after standardization</td>
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<tr>
<td>C3I</td>
<td>Standardize measures for binary confounder</td>
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<th>ID</th>
<th>CHAPTER 4: DESCRIBING RATIOS</th>
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<tr>
<td>C4A</td>
<td>Identify part in questions using &quot;What percentage…&quot;</td>
</tr>
<tr>
<td>C4B</td>
<td>Calculate percentages from simple count tables</td>
</tr>
<tr>
<td>C4C</td>
<td>Identify part in percent grammar statements</td>
</tr>
<tr>
<td>C4D</td>
<td>Identify part in percentage grammar statements</td>
</tr>
<tr>
<td>C4E</td>
<td>Convert statements: percentage to percent grammar</td>
</tr>
<tr>
<td>C4F</td>
<td>Convert statement: percent to percentage grammar</td>
</tr>
<tr>
<td>C4G</td>
<td>Identify part in questions using &quot;What is the percentage…&quot;</td>
</tr>
<tr>
<td>C4H</td>
<td>Identify part in statements: percent or percentage grammar</td>
</tr>
<tr>
<td>C4I</td>
<td>Identify part in questions: percent or percentage grammar</td>
</tr>
<tr>
<td>C4J</td>
<td>Calculate percentage from a complex count table</td>
</tr>
<tr>
<td>C4X</td>
<td>Identify influence of assembly on percentages and rates.</td>
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<tr>
<th>ID</th>
<th>CHAPTER 5: COMPARING RATIOS</th>
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<tbody>
<tr>
<td>C5B</td>
<td>Calculate percentage attributable from percentage/rate data.</td>
</tr>
<tr>
<td>C5C</td>
<td>Calculate cases attributable given rates and # of exposure cases</td>
</tr>
<tr>
<td>C5Q</td>
<td>Likely grammar compare: identify part/whole, test/base, common/distinct part</td>
</tr>
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