Guide to Proposing an INQ 240 Statistical Reasoning

**Overview**  
INQ 240 provides an inquiry-focused introduction to statistical methodologies. Students will gain an understanding of how decision making is accomplished using modern statistical techniques.

**Requirement Highlights**

Each INQ 240 course will:

1. Cover the basic statistics concepts listed below.
2. Use an introductory statistics textbook plus supplementary materials connecting to the section’s topic
3. Derive most of the final grade from assignments and tests consisting of quantitative reasoning
4. Require a paper or series of papers that cultivates complex ideas and skills in writing about technical, quantitative concepts. This paper requirement may be incorporated with the project described below, or instructors may assign a paper on a totally different topic.
5. Require a project that involves asking a question, determining what data is needed to answer that question, collecting and analyzing the data, and writing up the results. The tasks may be divided across several narrower projects. For example, question development and data collection might be a separate project from data analysis and discussion of results. Still, students should understand that these tasks are normally connected parts of a statistical study.
6. Require students to critique the use of statistics in articles or newspaper reports related to the theme of the course. This may be in either written or oral form.
7. Require Lunsford’s *Easy Writer*

**Statistics Content**

1. Tables, Charts and Plots

Dot Plot; Histogram; Stem-and-leaf Plot; Scatterplots;

Distribution Shapes – symmetric, skewed, mound-shaped, the normal (bell-shaped) curve, informal outliers.

2. Measures of location and measures of variation

Averages – mean, trimmed mean, median; Quartiles and Interquartile Range; The five-number summary and the box plot; A method for determining outliers; Standard deviation and variance

3. Informal inference/Introduction to Probability

Informal decision-making from data explorations; Some basic exposure to the ideas of probability using simulations; Some basic probability models and basic probability rules ; The Empirical Rule and an introduction to the normal distribution

4. Sampling

Parameters and Statistics; Sampling Distributions; Central Limit Theorem

5. Formal Inference

Confidence Intervals; Hypothesis Testing; Chi Square; ANOVA

6. Introduction to Linear Regression

Correlation; Least squares method; Regression coefficients

**Learning Outcomes**  
All INQ 240 sections share these learning outcomes. You must put them in your syllabus. You may supplement these with additional LOs specific to your content or goals. You may rephrase the common LOs if you ensure that you do not lose their essence.

1. Students will be able to use the methodologies of statistics to
   1. Investigate a topic of interest and make decisions based on the results.
   2. Design and carry out a simple statistical experiment.
   3. Critique news stories and journal articles that include statistical information. In the critique students will recognize variability and its consequences, identify potential sources of bias and both proper and improper cause and effect inference.
2. Students will be able to articulate the importance and limitations of using data and statistical methods in decision making.
3. Students will be able to write about course topics clearly and effectively.
4. Students will be able to interpret quantitative information related to the course topic.

For Global Perspective courses:

1. One or both of these outcomes
   1. Analyze selected issues or events by applying cultural frames of reference or perspectives.
   2. Analyze selected issues or events in terms of global interconnections and interdependencies

**Writing**  
INQ 240, like all other courses at the college, should build on the foundation of writing instruction begun in INQ 110.

* INQ 240 sections must require at least one paper that requires critical thinking. Instructors may determine the length, focus, and whether or not research is required.
* If you require students to incorporate source material, require them to cite it properly and teach them how to cite it properly. Do not assume that INQ 110 did all the work in this area.
* Emphasize the writing process. Instructors are urged to use drafts. Even if drafts are not graded in detail, final products will be far stronger if a draft is required.
* If students must locate, evaluate, and incorporate source materials into assignments, consider scheduling a library instruction day or requesting a LibGuide from your library liaison.

**Quantitative Reasoning**  
Each 200-level INQ course must address quantitative reasoning skills as a second emphasis.

* To qualify for quantitative reasoning secondary skills, the course must include instruction and assignments in at least three of the five QR skills:
  + gathering or selecting data
  + representing data
  + interpreting data
  + using data in decision-making
  + addressing uncertainty or significance of data
* Rubrics for QR can be found at <https://www.roanoke.edu/inside/a-z_index/intellectual_inquiry/inq_faculty_resources>

**Tests and quizzes**  
A final exam IS REQUIRED for INQ 240. Other tests and quizzes at the instructor’s discretion. Remember that many first-year students take this course and will benefit from structure and feedback.

**Does your course meet the Global Requirement?**

You can request that GEC designate your course as meeting the Global requirement at the time you propose it or at a later date.

Each Global Perspective course must

1. Address at least one of the global learning outcomes:
   1. Analyze selected issues or events by applying cultural frames of reference or perspectives.
   2. Analyze selected issues or events in terms of global interconnections and interdependencies
2. Include global content from at least one country outside the United States, and
3. Devote at least 50% of course time or assignments to topics supporting the global focus. Global interconnections and interdependencies assume an anthropocentric context, i.e., focus on ways humans affect or are affected by such global interconnections and interdependencies.

**Summary of items to include in your syllabus**

* Your section description
* The common learning outcomes for INQ 240 (earlier in this document)
* All of the stuff required in any syllabus, see <https://www.roanoke.edu/inside/a-z_index/academic_affairs/faculty_information/course_proposals_and_syllabi>
* A detailed daily schedule that includes
  + Readings with some indication of length
  + Due dates for major assignments, drafts, etc.
  + Clear indication of coverage of required statistics content (see above)
  + Project/paper components and deadlines

**INQ 240 Course Proposal Form** rev July 2018

Please delete any Guidelines pages and save just the Proposal pages as a separate document. This proposal form and the course syllabus are then uploaded at <https://www.roanoke.edu/inside/a-z_index/academic_affairs/faculty_information/course_proposals_and_syllabi>

1. **Name of person completing this form**: Click here to enter text.
2. **Section Title:** Click here to enter text.
3. **Section description for the COL including a central question or questions to be addressed in the course. Students are the primary audience for this description. Do not include details so specific that they are likely to change from year to year.** **Maximum length = 150 words.**  
   Click here to enter text.
4. **Does this topic have a Global perspective?** Choose an item.
5. **Critical Skills: All INQ 240 sections emphasize Writing and Quantitative Reasoning.**
6. **Anticipated instructor(s):** Click here to enter text.

**Specific requirements of INQ 240**

1. **Describe how students will investigate a topic and make decisions based upon the results. Be specific about which elements of quantitative reasoning will be included. (Gather or select data, represent data, interpret data, use data in decision-making, handle uncertainty or significance)**

Click here to enter text.

1. **Describe the amount and type of writing students will do as well as the instruction in or support for writing process you will provide.**

Click here to enter text.

1. **Feel free to add any additional information or comments you would like to share with GEC.**  
   Click here to enter text.

**Global requirement—complete this section only if you are requesting Global Designation**

1. **Which Global Perspective learning outcome will this course address?**

Choose an item.

1. **Describe assignments and pedagogies that help students develop the analysis skills needed for the specific the learning outcome you chose. Be specific in your description and the placement of these assignments in the course schedule. BE SURE THAT THESE ASSIGNMENTS SHOW IN YOUR SYLLABUS.**

Click here to enter text.

1. **Describe the assignment that will be used in this course that will allow the faculty member to assess this learning outcome.**

Click here to enter text.