**General Education Course Inclusion Proposal**

**Quantitative Reasoning and Analysis**

*This proposal form is intended for departments proposing a course for inclusion in the Northern Michigan University General Education Program. Courses in a component satisfy both the Critical Thinking and the component learning outcomes. Departments should complete this form and submit it electronically through the General Education SHARE site.*

**Course Name and Number:** SO208 Methods of Social Research I

**Home Department:** Sociology and Anthropology

**Department Chair Name and Contact Information** (phone, email): Alan McEvoy, 227-1687 amcevoy@nmu.edu

**Expected frequency of Offering of the course** (e.g. every semester, every fall): Every Semester

**Official Course Status**: Has this course been approved by CUP and Senate? YES

*Courses that have not yet been approved by CUP must be submitted to CUP prior to review by GEC. Note that GEC is able to review courses that are in the process of approval; however, inclusion in the General Education Program is dependent upon Senate and Academic Affairs approval of the course into the overall curriculum.*

**Overview of course** (please attach a current syllabus as well): *Please limit the overview to two pages (not including the syllabus)*

A. Overview of the course content

B. Explain why this course satisfies the Component specified and significantly addresses both learning outcomes

C. Describe the target audience (level, student groups, etc.)

D. Give information on other roles this course may serve (e.g. University Requirement, required for a major(s), etc.)

E. Provide any other information that may be relevant to the review of the course by GEC

**A & B: Overview of Course Content General Education Course Learning Goals**

This course meets the critical thinking outcome because students learn to use evidence to support ideas. It meets the quantitative reasoning outcome because students learn to use tools of mathematics, logic, and probability theory to perform data analysis; understand the connection between descriptive and inferential statistics; and be able to make decisions, predictions, or inferences about unknown characteristics of populations based upon the limited information contained in a sample drawn from that population. Learning objectives include:

* Understand different data collection methods and approaches to conduct scientific research (cycle and steps of research; deductive vs inductive; qualitative vs quantitative; probability sampling vs non-probability sampling).
* Understand important concepts in introductory level quantitative/statistical analysis (data and variables, levels of measurement, estimation procedures, sampling distribution, central limit theorem, and probability theory…).
* Differentiate different levels of variables and their appropriate methods in analysis.
* Understand and be able to conduct basic data analysis involve descriptive statistics and inferential statistics (different types of hypotheses tests).
* Understand and be able to create SPSS data set and using the software to perform statistical analysis.
* Students who successfully complete the course should have laid a solid foundation for research design (SO 308) and advanced data analysis (SO 408).

**The Main sections of this course include the following:**

* An overview of steps in the cycle of research; principles of research; defining elements (data, variable, hypothesis, theory, data collection and organization); and differentiate between inductive and deductive approach and the role of statistics in research.
* Basic skills in describing data (using numbers, tables and charts); four levels of measurement (nominal, ordinal, interval, and ratio); measures of central tendency and dispersion.
* Normal curve and probability theory.
* Sampling (probability vs nonprobability), sampling distribution, and CLT; point and interval estimation procedures.
* Different types of hypothesis tests (test for the mean, proportion, large vs small sample, one sample vs two sample, Z-test, T-test, Chi-square test, and F-test).
* Measures of association between two or more variables (nominal, ordinal, and interval/ratio level variables), and regression analysis.

C & D: This is a two-hundred level course that serves the general student population in that it fulfills a Gen Ed requirement. It also is a required course for Sociology majors, Social Work majors, Research Analyst minors, and other programs those who are interested in learning data analysis skills. Enrollment is capped at 30 students per section.

E: This course is taught by all members of the Sociology faculty.

**PLAN FOR LEARNING OUTCOMES
CRITICAL THINKING**

*Attainment of the CRITICAL THINKING Learning Outcome is required for courses in this component. There are several dimensions to this learning outcome. Please complete the following Plan for Assessment with information regarding course assignments (type, frequency, importance) that will be used by the department to assess the attainment of students in each of the dimensions of the learning outcome. Type refers to the types of assignments used for assessment such as written work, presentations, etc. Frequency refers to the number of assignments included such as a single paper or multiple papers. Importance refers to the relative emphasis or weight of the assignment to the entire course. For each dimension, please specify the expected success rate for students completing the course that meet the proficiency level and explain your reasoning. Please refer to the Critical Thinking Rubric for more information on student performance/proficiency in this area. Note that courses are expected to meaningfully address all dimensions of the learning outcome.*

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| **DIMENSION** | **WHAT IS BEING ASSESSED** | **PLAN FOR ASSESSMENT** |
| **Evidence** | Assesses quality of information that may be integrated into an argument | *Task Type & Frequency:*Six Quizzes （spread throughout the semesterThree Exams (E1, Midterm, Final)One Comprehensive Computer Assignment (close to end of semester)The quizzes and exams are designed to assess students’ understanding of the core concepts, logic reasoning, and data analysis skills. They cover both conceptual understanding and problem solving skills in social behavior data analysis. Exam I focuses on building blocks (key concepts such as variables, data, & methods of descriptive statistics; these also involve using evidence in reasoning). Exam II & III assess students’ ability to gather evidence for supporting ideas. E.g. to establish a causal relationship between X & Y and to make inferences from a sample to the population, a student should be able to 1) gather evidence for 3 conditions: time order, co-vary, & non-spurious association for the variables involved before making a decision; 2) gather evidence to differentiate level of variables to decide on which type of hypothesis is appropriate, then follow the 5-step procedure to conduct the test. Based on test results (evidence) conclusions are drawn about the target population (using probability theory, logic reasoning) whether to support or reject a research hypothesis concerning certain social behavior.The comprehensive computer assignment is to evaluate students’ basic skills in using SPSS software for data analysis.*Overall Grading Weight:**6 quzzes = 6 x 20 = 120 points**3 exams = 3 x 100 = 300 points**1 computer assignment = 80 points**Expected Proficiency Rates:*The department expects 75% or greater student proficiency upon course completion. |
| **Integrate** | Integrates insight and or reasoning with existing understanding to reach informed conclusions and/or understanding | *Task Type & Frequency:*Six Quizzes （spread throughout the semester）Three Exams (E1, Midterm, Final)One Comprehensive Computer Assignment (close to end of semester)The quizzes and exams are designed to assess students’ understanding of the core concepts, logic reasoning, and data analysis skills. They cover both conceptual understanding and problem solving skills in social behavior data analysis. Exam I focuses on building blocks (key concepts such as variables, data, & methods of descriptive statistics; these also involve using evidence in reasoning). Exam II & III assess students’ ability to gather evidence for supporting ideas. E.g. to establish a causal relationship between X & Y and to make inferences from a sample to the population, a student should be able to 1) gather evidence for 3 conditions: time order, co-vary, & non-spurious association for the variables involved before making a decision; 2) gather evidence to differentiate level of variables to decide on which type of hypothesis is appropriate, then follow the 5-step procedure to conduct the test. Based on test results (evidence) conclusions are drawn about the target population (using probability theory, logic reasoning) whether to support or reject a research hypothesis concerning certain social behavior.The comprehensive computer assignment is evaluate students’ basic skills in using SPSS software for data analysis.**To perform different types of hypothesis tests involving integration of understanding variables, data, probability theory, descriptive and inferential statistics…logic reasoning, and to draw conclusion.***Overall Grading Weight:**6 quzzes = 6 x 20 = 120 points**3 exams = 3 x 100 = 300 points**1 computer assignment =* 80 points*Expected Proficiency Rates:*The department expects 75% or greater student proficiency upon course completion. |
| **Evaluate** | Evaluates information, ideas, and activities according to established principles and guidelines | **Embedded in the assessment as above. Students need to be able to evaluate all given information (variables, data, probability theory, descriptive and inferential statistics…logic reasoning, and to draw conclusion) before making a decision on performing different types of hypothesis tests and draw a conclusion.** Concepts, logic reasoning, and data analysis skills will be embedded in quizzes, exams, and computer assignments throughout the course. . Exam II & III will be used to assess students’ ability to evaluate information, ideas, and activities following established guidelines in data analysis. The department expects 75% or greater student proficiency upon course completion. |

**PLAN FOR LEARNING OUTCOMES
QUANTITATIVE REASONING AND ANALYSIS**

*Attainment of the QUANTITATIVE REASONING AND ANALYSIS Learning Outcome is required for courses in this component. There are several dimensions to this learning outcome. Please complete the following Plan for Assessment with information regarding course assignments (type, frequency, importance) that will be used by the department to assess the attainment of students in each of the dimensions of the learning outcome. Type refers to the types of assignments used for assessment such as written work, presentations, etc. Frequency refers to the number of assignments included such as a single paper or multiple papers. Importance refers to the relative emphasis or weight of the assignment to the entire course. For each dimension, please specify the expected success rate for students completing the course that meet the proficiency level and explain your reasoning. Please refer to the Rubric for more information on student performance/proficiency in this learning outcome. Note that courses are expected to meaningfully address all dimensions of the learning outcome.*

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| **DIMENSION** | **WHAT IS BEING ASSESSED** | **PLAN FOR ASSESSMENT** |
| **Calculation** | Ability to perform mathematical/numerical operations. | **Embedded in the assessment as above. Calculation skills are required in the whole process of data analysis (from level of measurement, variables, data, probability theory, descriptive and inferential statistics…logic reasoning, and to draw conclusion on hypothesis tests .**Concepts, logic reasoning, and data analysis skills will be embedded in quizzes, exams, and computer assignments throughout the course. . Exam II & III will be used to assess students’ ability to evaluate information, ideas, and activities following established guidelines in data analysis. The department expects 75% or greater student proficiency upon course completion. |
| **Analysis/Application** | Ability to manipulate quantitative data to produce new data.Ability to use data to make judgments and draw conclusions. | **Embedded in the assessment as above. Ability to manipulate quantitative data and make judgements to reach a conclusion is an integral necessity in performing hypothesis tests of social behavior problems (from variables data, probability theory, descriptive and inferential statistics…logic reasoning, and to draw conclusion).**Regular quizzes, exams, and computer assignments throughout the semester. Exam II & III will be used for assessing students’ ability to manipulate data, make judgments, and draw conclusions, as shown in different types of hypothesis tests (inferential statistics). The department expects 75% or greater student proficiency upon course completion. |
| **Interpretation** | Ability to explain information presented in mathematical forms (e.g. equations, graphs, diagrams, tables, and words). | **Embedded in the assessment as above. The last step in performing hypothesis tests on social behavior is to interpret test outcomes, and make generalizations from the sample to the target population.** Regular quizzes, exams, and computer assignments throughout the semester. Exam II & III will be used to assess students’ ability in interpreting data analysis results.The department expects 75% or greater student proficiency upon course completion. |
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