**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:** EC 410 – Managerial Economics

**Home Department:** Economics

**Department Chair Name and Contact Information** (phone, email): Robert Quinn roquinn@nmu.edu

**Expected frequency of Offering of the course**: Every other fall

**Official Course Status**: Has this course been approved by CUP and Senate? Yes (many years ago)

*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**:

1. Overview of the course content:

The goal of this course is to help the student to develop a mathematical foundation of microeconomics and microeconomic research, and be able to apply this knowledge to real world situations. An objective is to extend students’ knowledge of microeconomic theory first begun in EC 201. The course includes real world applications of concepts such as supply and demand, elasticity, and the analysis of market structures. Students are taught estimation techniques and how to apply them to modern business problems, including the identification of data sources and data collection techniques. Finally, the goal of the course is to learn and experience the application of the linkage between economic theory and the analysis of business activities.

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

*Critical Thinking Learning Outcomes:* In order to satisfy the *Evidence* learning outcome dimension, EC 410 requires students to use information gleaned from classroom experience and text readings to provide a background and knowledge of supply and demand, elasticity, and market structure. This background will include a mathematical foundation for the theories discussed in class. In order to satisfy the *Integration* learning outcome dimension, EC 410 requires students to use the theories and concepts presented in class and to apply them to real world and business world applications. For the *Evaluation* learning outcome dimension, EC 410 requires students to critically to use the ideas and concepts presented in class to analyze situation presented in examination frameworks and in a research paper that integrates the ideas learned in the class.

*Quantitative Reasoning and Analysis Learning Outcomes:* In order to satisfy the *Calculation* learning outcome dimension, EC 410 requires students to review concepts of algebra and statistics, and to learn the basics of calculus. In order to satisfy the *Analysis/Application* learning outcome dimension, EC 410 requires students to use the mathematical and statistical concepts discussed in class and apply them first to economic theory and basic economic problems and then to real world and business applications. For the *Interpretation* learning outcome dimension, EC 410 requires that students use the mathematical concepts discussed in class to draw graphs and interpret mathematical equations on the midterm and final examination. Students are also required to submit a research paper that applies mathematical and statistical concepts to real world data and they must present this data in an organized analytical framework in order to answer a research question.

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

EC 410 Managerial Economics should also be attractive to students majoring in Economics, other liberal arts fields, and business. The course should be attractive to students hoping to attend graduate or professional school after graduation. It should also be of interest to students who wish to not only learn mathematical and statistical concepts, but learn to apply them to real world situations and the business environment.

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

Currently EC 410 counts toward the economics major and the economics minor.  If approved by GEC, we hope to submit it to the Math Dept. for approval to count for the new math requirement.  We also hope to work with the College of Business to formalize the process of getting EC 410 to count as a business elective.

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

Although in might at first seem that Managerial Economics is an advanced specialized class in economics, it really is a survey class of the mathematical tools necessary to succeed at the master’s level in both business and economics. Managerial economics is more of a “how to” guide to lower level calculus and OLS regression analysis. It is not meant as a substitute for either basic calculus or statistics which tend to have a more “why this works” approach. Lastly, our every other year offering of EC 410 is the result of our current demand structure. If GEC approval results in an increase in demand, the Department is prepared to offer EC 410 on an annual basis.

**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*: Research paper where each student is required to assemble 20 years of annual data and estimate a demand function for a microeconomic concept.  *Frequency*: Due at end of semester  *Overall Grading Weight*: 20% of total grade  *Expected Proficiency Rate*: The current proficiency rate for the EC 410 research paper is quite high because, in general, students who have taken the course were those planning on attending graduate school. If EC 410 is accepted into GEC we will have a more diverse pool of students, which would drop the proficiency likely to around 75%.    *Task Type*: Four homework assignments that reinforce the application of mathematical techniques presented in class. One of the assignments includes gathering at least five demand side independent variables and a single dependent variable with associated references and commenting on the quality of those references.  *Frequency*: Due at four intervals throughout the semester  *Overall Grading Weight*: 13.33% of total grade  *Expected Proficiency Rate*: The current proficiency rate for the EC 410 research paper is quite high because, in general, students who have taken the course were those planning on attending graduate school. If EC 410 is accepted into GEC we will have a more diverse pool of students, which would drop the proficiency likely to around 75%. |
| **Integrate** | Integrates insight and or reasoning with existing understanding to reach informed conclusions and/or understanding | *Task Type*: Research paper where each student is required to assemble 20 years of annual data and estimate a demand function for a microeconomic concept.  *Frequency*: Due at end of semester  *Overall Grading Weight*: 20% of total grade  *Expected Proficiency Rate*: The current proficiency rate for the EC 410 research paper is quite high because, in general, students who have taken the course were those planning on attending graduate school. If EC 410 is accepted into GEC we will have a more diverse pool of students, which would drop the proficiency likely to around 75%. |
| **Evaluate** | Evaluates information, ideas, and activities according to established principles and guidelines | *Task Type*: Examinations including both objective and essay elements.  *Frequency*: Twice a Semester  *Overall Grading Weight*: 66.67% (33.33% each) for the entire exams. Approximately 2/3 of each of the exams are devoted to critical thinking by applying economic theory (such as supply and demand, elasticities, market structure), mathematics, and statistics to real world problems in the form of essays and objective problems.  *Expected Proficiency Rate*: The current proficiency rate for the EC 410 exams are quite high because, in general, students who have taken the course were those planning on attending graduate school. If EC 410 is accepted into GEC we will have a more diverse pool of students which would drop the proficiency rate, likely to around 75%.  *Task Type*: Research paper where each student is required to assemble 20 years of annual data and estimate a demand function for a microeconomic concept.  *Frequency*: Due at end of semester  *Overall Grading Weight*: 20% of total grade  *Expected Proficiency Rate*: The current proficiency rate for the EC 410 research paper is quite high because, in general, students who have taken the course were those planning on attending graduate school. If EC 410 is accepted into GEC we will have a more diverse pool of students, which would drop the proficiency likely to around 75%.  *Task Type*: Four homework assignments that utilize the class material in such as way as to encourage the student to think about the real world in economic terms. The assignments include gathering at least five demand side variables with associated references and commenting on the quality of those references.  *Frequency*: Due at four intervals throughout the semester  *Overall Grading Weight*: 13.33% of total grade  *Expected Proficiency Rate*: The current proficiency rate for the EC 410 research paper is quite high because, in general, students who have taken the course were those planning on attending graduate school. If EC 410 is accepted into GEC we will have a more diverse pool of students, which would drop the proficiency likely to around 75%. |

**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. | *Task Type*: Examinations including both objective and essay elements.  *Frequency*: Twice a Semester  *Overall Grading Weight*: 66.67% (33.33% each) for the entire exams. Approximately 1/3 of each of the exams are basic mathematical concepts, including algebra, calculus, and statistics  *Expected Proficiency Rate*: The current proficiency rate for the EC 410 exams are quite high because, in general, students who have taken the course were those planning on attending graduate school. If EC 410 is accepted into GEC we will have a more diverse pool of students which would drop the proficiency rate, likely to around 75%. |
| **Analysis/Application** | Ability to manipulate quantitative data to produce new data.  Ability to use data to make judgments and draw conclusions. | *Task Type*: Examinations including both objective and essay elements.  *Frequency*: Twice a Semester  *Overall Grading Weight*: 66.67% (33.33% each) for the entire exams. Approximately 2/3 of each of the exams are objective and essay questions designed to get the student to apply mathematical and statistical concepts to real world and business world situations.  *Expected Proficiency Rate*: The current proficiency rate for the EC 410 exams are quite high because, in general, students who have taken the course were those planning on attending graduate school. If EC 410 is accepted into GEC we will have a more diverse pool of students which would drop the proficiency rate, likely to around 75%.  *Task Type*: Research paper where each student is required to assemble 20 years of annual data and estimate a demand function for a microeconomic concept, using statistical analysis.  *Frequency*: Due at end of semester  *Overall Grading Weight*: 20% of total grade  *Expected Proficiency Rate*: The current proficiency rate for the EC 410 research paper is quite high because, in general, students who have taken the course were those planning on attending graduate school. If EC 410 is accepted into GEC we will have a more diverse pool of students, which would drop the proficiency likely to around 75%. |
| **Interpretation** | Ability to explain information presented in mathematical forms (e.g. equations, graphs, diagrams, tables, and words) | *Task Type*: Examinations including both objective and essay elements.  *Frequency*: Twice a Semester  *Overall Grading Weight*: 66.67% (33.33% each) for the entire exams. Approximately 2/3 of each of the exams are objective and essay questions using graphs and diagrams designed to get the student to apply mathematical and statistical concepts to real world and business world situations.  *Expected Proficiency Rate*: The current proficiency rate for the EC 410 exams are quite high because, in general, students who have taken the course were those planning on attending graduate school. If EC 410 is accepted into GEC we will have a more diverse pool of students which would drop the proficiency rate, likely to around 75%.  *Task Type*: Research paper where each student is required to assemble 20 years of annual data and estimate a demand function for a microeconomic concept, using statistical analysis. The student must not only develop the demand function, but thoroughly explain the mathematical and statistical aspects of the demand function in words.  *Frequency*: Due at end of semester  *Overall Grading Weight*: 20% of total grade  *Expected Proficiency Rate*: The current proficiency rate for the EC 410 research paper is quite high because, in general, students who have taken the course were those planning on attending graduate school. If EC 410 is accepted into GEC we will have a more diverse pool of students, which would drop the proficiency likely to around 75%. |