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| **Assurance of Student Learning Report****2021-2022** |
| *Gordon Ford College of Business/Ogden College*  | *Economics/Mathematics* |
| *Mathematical Economics BS 731* |
| *Dr. Alex Lebedinsky, Chair*  |

***Is this an online program***? [ ]  Yes [x]  No

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| ***Use this page to list learning outcomes, measurements, and summarize results for your program. Detailed information must be completed in the subsequent pages.*** |
| **Student Learning Outcome 1:**  Students will demonstrate their ability to apply mathematical models to study economic questions. |
| **Instrument 1** | Direct: Analysis of Capstone Project/Research Paper |
| **Based on your results, check whether the program met the goal Student Learning Outcome 1.**  | **[x]  Met** | **[ ]  Not Met** |
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| **Student Learning Outcome 2:**  Students will demonstrate ability to convey their research findings using oral communication. |
| **Instrument 1** | Direct: Capstone Project Poster Presentation |
| **Based on your results, check whether the program met the goal Student Learning Outcome 2.**  | **[x]  Met** | **[ ]  Not Met** |
| **Student Learning Outcome 3:** Students will demonstrate knowledge of key principles of microeconomics. |
| **Instrument 1** | Direct: Microeconomics Exam |
| **Based on your results, check whether the program met the goal Student Learning Outcome 3.**  | **[ ]  Met** | **[x]  Not Met** |
| **Student Learning Outcome 4:**  Students will demonstrate knowledge of key principles of macroeconomics. |
| **Instrument 1** | Direct: Macroeconomics Exam |
| **Based on your results, check whether the program met the goal Student Learning Outcome 4.**  | **[ ]  Met** | **[x]  Not Met** |
| **Program Summary (Briefly summarize the action and follow up items from your detailed responses on subsequent pages.)**  |
| Students met only two of the four the stated learning objectives. There is a notable decline across all metrics compared to the previous assessment cycle. Analysis of the individual items of assessment rubrics identified potential areas of improvement such as formulating better research questions on the senior capstone project.  |

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| **Student Learning Outcome 1** |
| **Student Learning Outcome**  | Students will demonstrate their ability to apply mathematical models to study economic questions. |
| **Measurement Instrument 1**  | DIRECT measures of student learning: Students in the Mathematical Economics major (731) are required to complete a capstone course at the end of the program (ECON 497 or MATH 497). One of the requirements of the course is to write a research paper that synthesizes the knowledge or economics and mathematics. The goal of the project is to assess how well the students can apply their knowledge to study real-world questions. The papers are evaluated on the following criteria:1. Did a student formulate an appropriate research question grounded in economic theory?2. Does the paper contain an adequate literature review? 3. Did a student design an appropriate quantitative model to study the research question?4. Did the student employ appropriate data to test the hypothesis and interpret the findings correctly? |
| **Criteria for Student Success** | At the end of the program, students should be able to perform on average at the level of Capstone (4) or Milestone (3) according to LEAP *Inquiry* *and Analysis* and *Quantitative Literacy* rubrics. |
| **Program Success Target for this Measurement** | 80% or more students should meet the criteria for student success outlined above  | **Percent of Program Achieving Target** | 78.6% (11/14)  |
| **Methods**  | Direct artifacts were collected from the students in the ECON 497 senior assessment seminar. The data cover the entire population of Spring 2022 graduates of the program (N=14). The papers were evaluated by three economics faculty on the four criteria listed above using a 1-4 scale for each criterion. The scores were assigned based on LEAP Inquiry and Analysis (IA) and Quantitative Literacy (QL) rubric items (1) Topic Selection [IA], (2) Existing Knowledge, Research and/or Views [IA], (3) Representation [QL], (4) Application/Analysis [QL]. Using this rubric, each evaluator produced an average score for each paper by computing a simple average of the four items of the rubric. Therefore, each paper received three scores – one from each evaluator – and the mean of these three score was computed for each student. |
| **Based on your results, highlight whether the program met the goal Student Learning Outcome 1.** | **[x]  Met** | **[ ]  Not Met** |
| **Actions** (Describe the decision-making process and actions for program improvement. The actions should include a timeline.) |
| While overall the program (almost) met its goal, analysis of individual items in the rubric revealed some weaknesses: Students had some trouble with item 1 in the rubric (Topic Selection) but they did well on the remaining three items of the rubric. During the 2022-2023 academic year, more attention will be paid in the Senior Assessment seminar and ECON 465 (Regression and Econometrics), a course that synthesizes a lot of knowledge in the program, to helping students develop interesting and relevant topics for research.  |
| **Follow-Up** (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.) |
| During the next assessment cycle, we will continue to use the same instruments as they have provided us with useful information and allowed us to identify the areas that need improvement. During the 2022-23 asseemsnt cycle we will measure whether greater integration and discussion of economic research in the curriculum helped students with designing mathematical models. If there is no notable improvement, the curriculum map will be revised with the goal of exposing student more to examples of economic research in intermediate classes (ECON 302 and ECON 303, Intermediate Micro- and Macroeconomics) and reinforcing that knowledge in the ECON 465 – Regression and Econometrics.  |
| **Next Assessment Cycle Plan**  |
| We plan to continue using the same assessment method as it yields consistent and informative data which allows us to track progress and make adjustments.  |

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| **Student Learning Outcome 2** |
| **Student Learning Outcome**  | Students will demonstrate ability to convey research ideas and findings using oral communication. |
| **Measurement Instrument 1** | DIRECT measures of student learning: Students in the Mathematical Economics major (731) are required to complete a capstone course at the end of the program (ECON 497 or MATH 497). During that course, students are required to write a paper and present it to the economics faculty. The presentations are structured as a mini-conference with each student giving a poster presentation. Each student is required to prepare a poster, deliver a brief summary of his or her paper, and answer follow-up questions. The presentations are evaluated on the following criteria:1. Was the information organized well on the poster? 2. Did the student follow good practices when designing the poster? 3. Did the student present the material well? |
| **Criteria for Student Success** | At the end of the program, students should be able to perform at the level of Capstone (4) or Milestone (3) according to LEAP *Oral Communication* rubric. |
| **Program Success Target for this Measurement** | 80% or more students should meet the criteria for student success outlined above  | **Percent of Program Achieving Target** | 78.6% (11/14)  |
| **Methods**  | Students’ presentations were rated on the three criteria listed above by all of the faculty who attended the presentation using a 1-4 scale for each criterion. The scores were assigned based on LEAP *Oral Communication* rubric items (1) Organization, (2) Supporting Material, (3) and Language. The rubric is attached below. Using this rubric, an average score for each presentation by computing a simple average of the three items of the rubric. |
| **Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 2.** | **[x]  Met** | **[ ]  Not Met** |
| **Actions** (Describe the decision-making process and actions planned for program improvement. The actions should include a timeline.) |
| As with SLO1, the data revealed that we almost met the goal of this SLO. Most of the students performed very well on this learning objective with 12 out of 14 students receiving high marks for their presentations. Two students in particular struggled in the program and in this class, but the rest of the group demonstrated high skill levels on all three items of the rubric.  |
| **Follow-Up** (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.) |
| No changes are planned during the next assessment cycle, but if the problem persists, it will be addressed in the Senior Assessment Seminar by identifying students who are likely to struggle with the oral presentation of their project.  |
| **Next Assessment Cycle Plan**  |
| We plan to continue using the same assessment method as it yields consistent and informative data which allows us to track progress and make adjustments.  |

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| **Student Learning Outcome 3** |
| **Student Learning Outcome**  | Students will demonstrate knowledge of key principles of microeconomics. |
| **Measurement Instrument 1** | DIRECT measures of student learning: Students in the Mathematical Economics major (731) are required to complete a capstone course at the end of the program. During the course, students have two take two exams – a microeconomics exam and a macroeconomics exam. The exams used in the class have been developed by the National Council for Economic Education (NCEE). These exams were designed with two objectives in mind: “(1)… to offer a reliable and valid assessment instrument for students in principles of economics curses; and (2) to provide norming data for large national sample of students in principles classes…”. The exams cover a range of economic topics and can serve as a good measure not only of the attainment of knowledge in the principles courses but also as a measure of retention and reinforcement of that knowledge throughout the program. |
| **Criteria for Student Success** | At the end of the program students should perform at the 70th percentile or higher compared to the national sample of economics principles students.  |
| **Program Success Target for this Measurement** | 75% of the students  | **Percent of Program Achieving Target** | 57.5% |
| **Methods**  | The test used as an instrument is the Test of Understanding of College Economics (TUCE), developed by NCEE in conjunction with the American Economic Association. The tests cover a range of topics normally covered in a microeconomics principles course as well as in the rest of the upper-level courses of a typical economics program. The test consist of 30 multiple-choice questions. Based on the national sample of 3,255 college and university students who took these tests the score of 14 corresponds to a 67-th percentile and a score of 15 corresponds to 74th percentile. The tests were administered to all of the students in the senior assessment seminar.Out of 14 students who took the exam, 8 students scored 15 points or higher, which amounts to 57% of all students. The average score was 17.3.  |
| **Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.** | **[ ]  Met** | **[x]  Not Met** |
| **Actions** (Describe the decision-making process and actions for program improvement. The actions should include a timeline.) |
| The results represent a notable decrease in performance from the previous assessment cycle when 80% of the students met this goal. It is not clear what caused this drop but it is likely attributed to lower retention and reduced quality of instruction during the pandemic.  |
| **Follow-Up** (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.) |
| Continue to monitor students’ performance during on the microeconomics exam. Use the fall 2022 assessment class as a mid-cycle gauge. Monitor results in the intermediate microeconomics class with the goal of mitigating gaps in knowledge and reinforcing the material.  |
| **Next Assessment Cycle Plan** (Please describe your assessment plan timetable for this outcome) |
| No changes are planned in the assemsnet mechanism. The exam provides a consistent and robust tool for measuring student performance. The exams will be administered again during the fall 2022 and spring 2023 semesters.  |

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| **Student Learning Outcome 4** |
| **Student Learning Outcome**  | Students will demonstrate knowledge of key principles of microeconomics. |
| **Measurement Instrument 1** | DIRECT measures of student learning: Students in the Mathematical Economics major (731) are required to complete a capstone course at the end of the program. During the course, students have two take two exams – a microeconomics exam and a macroeconomics exam. The exams used in the class have been developed by the National Council for Economic Education (NCEE). These exams were designed with two objectives in mind: “(1)… to offer a reliable and valid assessment instrument for students in principles of economics curses; and (2) to provide norming data for large national sample of students in principles classes…”. The exams cover a range of economic topics and can serve as a good measure not only of the attainment of knowledge in the principles courses but also as a measure of retention and reinforcement of that knowledge throughout the program. |
| **Criteria for Student Success** | At the end of the program students should perform at the 70th percentile or higher compared to the national sample of economics principles students.  |
| **Program Success Target for this Measurement** | 75% of the students  | **Percent of Program Achieving Target** | 69% |
| **Methods**  | The test used as an instrument is the Test of Understanding of College Economics (TUCE), developed by NCEE in conjunction with the American Economic Association. The tests cover a range of topics normally covered in a macroeconomics principles course as well as in the rest of the upper-level courses of a typical economics program. The test consist of 30 multiple-choice questions. Based on the national sample of 3,255 college and university students who took these tests the score of 16 is the 69th percentile and 17th is 74th percentile. The tests were administered to all of the students in the senior assessment seminar.Out of 13 students who took the exam, 9 students scored 16 points or higher, which amounts to 69% of all students. The average score was 19.  |
| **Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.** | **[ ]  Met** | **[x]  Not Met** |
| **Actions** (Describe the decision-making process and actions for program improvement. The actions should include a timeline.) |
| Similar to SLO3, the results represent a notable decrease in performance from the previous assessment cycle when close to 90% of the students met this goal. It is not clear what caused this drop but it is likely attributed to lower retention and reduced quality of instruction during the pandemic. |
| **Follow-Up** (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.) |
| Continue to monitor students’ performance during on the macroeconomic exam. Use the fall 2022 assessment class as a mid-cycle gauge. Monitor results in the intermediate macroeconomics class with the goal of mitigating gaps in knowledge and reinforcing the material.  |
| **Next Assessment Cycle Plan** (Please describe your assessment plan timetable for this outcome) |
| No changes are planned in the assemsnet mechanism. The exam provides a consistent and robust tool for measuring student performance. The exams will be administered again during the fall 2022 and spring 2023 semesters.  |

Rubric for SLO 1

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|   | **Capstone** | **Milestones** | **Benchmark** |
|   | **4** | **3** | **2** | **1** |
| **Topic selection***LEAP Inquiry and Analysis* | Identifies a creative, focused, and manageable topic that addresses potentially significant yet previously less explored aspects of the topic. | Identifies a focused and manageable/doable topic thatappropriately addresses relevant aspects of the topic. | Identifies a topic that whilemanageable/doable, is too narrowly focused and leaves out relevant aspects of the topic. | Identifies a topic that is far too general and wide-ranging as to be manageable and doable. |
| **Existing Knowledge, Research,and/or Views***LEAP Inquiry and Analysis* | Synthesizes in-depth information from relevant sources representing various points of view/approaches. | Presents in-depth information from relevant sources representing various points of view/approaches. | Presents information from relevant sources representing limited points of view/approaches. | Presents information from irrelevant sources representing limited points of view/approaches. |
| **Representation**Ability to convert relevant information into various mathematical forms (e.g., equations, graphs, diagrams, tables, words)*LEAP Quantitative Literacy* | Skillfully converts relevant information into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding. | Competently converts relevant information into an appropriate and desired mathematicalportrayal. | Completes conversion of information but resulting mathematical portrayal is only partially appropriate or accurate. | Completes conversion of information but resulting mathematical portrayal is inappropriate or inaccurate. |
| **Analysis**Ability to make judgments and draw appropriate conclusions based on the quantitative analysis of data, while recognizing the limits of this analysis*LEAP Quantitative Literacy* | Uses the quantitative analysis of data as the basis for deep and thoughtful judgments, drawing insightful, carefully qualified conclusions fromthis work. | Uses the quantitative analysis of data as the basis for competent judgments, drawing reasonableand appropriately qualified conclusions from this work. | Uses the quantitative analysis of data as the basis for workmanlike (without inspiration or nuance,ordinary) judgments, drawing plausible conclusions from this work. | Uses the quantitative analysis of data as the basis for tentative, basic judgments, although is hesitant or uncertain about drawing conclusionsfrom this work. |

Rubric for SLO 2

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|   | **Capstone** | **Milestones** | **Benchmark** |
|   | **4** | **3** | **2** | **1** |
| **Organization***LEAP Oral Communication* | Organizational pattern (specificintroduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive. | Organizational pattern (specificintroduction and conclusion, sequencedmaterial within the body, and transitions) is clearly and consistently observable within the presentation. | Organizational pattern (specificintroduction and conclusion, sequencedmaterial within the body, and transitions) is intermittently observable within the presentation.  | Organizational pattern (specificintroduction and conclusion, sequencedmaterial within the body, and transitions) is not observable within the presentation. |
| **Language***LEAP Oral Communication* | Language choices are imaginative,memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience. | Language choices are thoughtful andgenerally support the effectiveness of the presentation. Language in presentation is appropriate to audience. | Language choices are mundane andcommonplace and partially support theeffectiveness of the presentation.Language in presentation is appropriate to audience. | Language choices are unclear andminimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience. |
| **Supporting Material***LEAP Oral Communication* | A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/authority on the topic. | Supporting materials (explanations,examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that generally supports thepresentation or establishes the presenter's credibility/authority on the topic. | Supporting materials (explanations,examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information oranalysis that partially supports thepresentation or establishes the presenter's credibility/authority on the topic. | Insufficient supporting materials(explanations, examples, illustrations,statistics, analogies, quotations fromrelevant authorities) make reference toinformation or analysis that minimallysupports the presentation or establishes the presenter's credibility/authority on the topic. |