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| **Assurance of Student Learning Report****2020-2021** |
| *Gordon Ford College of Business/Ogden College*  | *Economics/Mathematics* |
| *Mathematical Economics BS 731* |
| *Dr. Alex Lebedinsky, Chair*  |

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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** |
| **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.**  | **[x]  Met** | **[ ]  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.**  | **[x]  Met** | **[ ]  Not Met** |
| **Program Summary (Briefly summarize the action and follow up items from your detailed responses on subsequent pages.)**  |
| Students met the stated learning objectives. Overall, students performed roughly on the same level as during the 2019-2020 assessment cycle. Analysis of the individual items of assessment rubrics identified potential areas of improvement that including formulating research questions and better model design.  |

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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** | 89% (17/19)  |
| **Methods**  | Direct artifacts were collected from the students in the ECON 497 senior assessment seminar. The data cover the entire population of 2020-21 graduates of the program (N=9 in the fall of 2019 and N=10 in the spring of 2021). 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 met its goal, analysis of individual items in the rubric revealed some weaknesses: Students had some trouble with items 3 and 4 in the rubric (Representation and Application/Analysis). The data suggests that students experienced difficulty with both designing mathematical models to represent the economic questions they wanted to study and with the empirical analysis of their models. To mitigate this, upper-level electives will include greater number of examples demonstrating how research questions are formulated and translated into mathematical models and how statistical techniques are applied to test these models with real-world data. |
| **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 2021-22 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 introducing economic modeling 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 outcomes: Students in the Economics major (638) are required to complete a capstone course at the end of the program. 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** | 84% (16/19)  |
| **Methods**  | Normally, the data are based on direct observations of poster presentations. Due to COVID-19 pandemic, the student conference could not take place, so each student recorded his or her presentation. Three faculty members served as the assessment committee tasked with evaluating all of the recorded presentations to ensure consistency of measurement. Students’ presentations were rated on the three criteria listed above 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, each evaluator produced an average score for each presentation by computing a simple average of the three items of the rubric, with each student receiving three scores – one from each evaluator – and the mean of these three score was computed was computed for each student. |
| **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.) |
| The data reveal that during while the program met its goal, there were some areas of weakness: 89% of the students had well designed supporting materials (presentation slides), but not all relevant information was effectively organized (68% perfumed satisfactory on that item of the rubric). Students did well on delivery of presentation with 79% of the students performing at the desired level. Performance on this learning outcome could have been affected by COVID: Under normal circumstances, students have one-on-one meetings with the instructor of the ECON 497 course where they get individual feedback on their posters, which was not possible this year due to social distancing.  |
| **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 placing greater focus on developing presentations skills. |
| **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. If the social distancing restrictions are lifted, during 2021-22 academic year, this SLO will be measured using a face-to-face poster session instead of recorded presentations.  |

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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 Economics major (638) 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** | 85% |
| **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 20 students who took the exam, 17 students scored 15 points or higher, which amounts to 85% of all students. The average score was 20.6.  |
| **Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.** | **[x]  Met** | **[ ]  Not Met** |
| **Actions** (Describe the decision-making process and actions for program improvement. The actions should include a timeline.) |
| The students in the program are currently performing at the national average. We will continue to monitor performance during the next assessment cycle.  |
| **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 microeconomic exam. Use the fall 2021 assessment class as a mid-cycle gauge.  |
| **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 2021 and spring 2022 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 Economics major (638) 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** | 75% |
| **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 20 students who took the exam, 15 students scored 16 points or higher, which amounts to 75% of all students. The average score was 20.6.  |
| **Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.** | **[ ]  Met** | **[ ]  Not Met** |
| **Actions** (Describe the decision-making process and actions for program improvement. The actions should include a timeline.) |
| The students in the program are currently performing at the national average. We will continue to monitor performance during the next assessment cycle.  |
| **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 microeconomic exam. Use the fall 2021 assessment class as a mid-cycle gauge.  |
| **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 2021 and spring 2022 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. |