

College of Arts and Sciences

Department of Statistics | Statistics and Biostatistics Programs

Table 3: Student Learning Outcomes

Doctorate in Statistics

Outcome Type	Outcome	Assessment & Evaluation Process
Program Outcome: Increased Presence of Student Research	We seek to continue to increase the number of professionally reviewed scholarly articles published by our PhD students while they are students in our department.	By encouraging our PhD students to publish their research while they are graduate students, we increase recognition of both student accomplishment and department research excellence. Our goal is that 38% of graduating PhD students have author credit on at least one accepted paper in a professionally reviewed journal or proceedings.
Learning Outcome: Present statistical analyses and research	Students completing the PhD program should have the ability to express orally the results of statistical analyses and research to professional audiences external to our department.	Our PhD students are required to make presentations within the department. We will encourage our students to go beyond this friendly audience and present external presentations, as well. There is a ready-made venue for this: professional and academic conferences and meetings. Our goal is that 38% of graduating PhD students have made at least one presentation on research or statistical analyses at a professional or academic conference or meeting.
Learning Outcome: Submit student research for external evaluation	Students completing the PhD program should have the ability to generate written research and statistical analyses at a level suitable for external review by professional academic statisticians.	Our PhD students have long been required to create written projects for coursework, a prospectus and a dissertation. We will now encourage our students to also generate written research and analyses that will be subject to external, rather than department internal, review. Such reviews consider both the quality of writing and the level of research (content) in the submission. Our goal is that 66% of graduating PhD students will have author credit on at least one submitted paper to a refereed professional or academic journal.

Source: FSU Institutional Effectiveness Portal, 2018-19.

Doctorate in Biostatistics

Outcome Type	Outcome	Assessment & Evaluation Process
Program Outcome: Increased Presence of Student Research	We seek to continue to increase the number of professionally reviewed scholarly articles published by our PhD students while they are students in our department.	By encouraging our PhD students to publish their research while they are graduate students, we increase recognition of both student accomplishment and department research excellence. Our goal is that 38% of graduating PhD students have author credit on at least one accepted paper in a professionally reviewed journal or proceedings.
Learning Outcome: Present statistical analyses and research	Students completing the PhD program should have the ability to express orally the results of statistical analyses and research to professional audiences external to our department.	Our PhD students are required to make presentations within the department. We will encourage our students to go beyond this friendly audience and present external presentations, as well. There is a ready-made venue for this: professional and academic conferences and meetings. Our goal is that 42% of graduating PhD students have made at least one presentation on research or statistical analyses at a professional or academic conference or meeting.
Learning Outcome: Submit student research	Students completing the PhD program should have the ability to generate written research and	Our PhD students have long been required to create written projects for coursework, a prospectus and a dissertation. We will now encourage our students to also generate written research and analyses that will be subject to external, rather than department internal, review. Such reviews consider both the

for external evaluation	statistical analyses at a level suitable for external review by professional academic statisticians.	quality of writing and the level of research (content) in the submission. Our goal is that 50% of graduating PhD students will have author credit on at least one submitted paper to a refereed professional or academic journal.
-------------------------	--	---

Source: FSU Institutional Effectiveness Portal, 2018-19.

Masters in Statistics

Outcome Type	Outcome	Assessment & Evaluation Process
Program Outcome: Masters to PhD conversion rate	By the end of the year, the program will convert 25% of its second year students into PhD students.	The Statistics office staff will look up the student records at the beginning of the Fall semester. They will count how many students received the MS degree at the FSU main campus in the previous academic year and how many were admitted into the PhD program by passing the PhD qualifying exam and finding a PhD advisor. Our goal is that 25% of the MS students successfully complete these two steps and become doctoral students in our department.
Learning Outcome: Statistical methods and software	Upon completion of the course of instruction, the student will be able to employ modern statistical techniques and software effectively to solve problems and analyze data.	Our goal is 90% of the students scoring 83% or better in a portfolio of assessments from one of the following six topic sequences: abstract algebra, applied analysis and differential equations, mathematical modeling, numerical analysis, real and complex analysis, and topology.
Learning Outcome: Ability to communicate statistical analyses	Upon completion of the course of instruction, the student will be able to express statistical results and inferences in writing and orally to both technical and non-technical audiences.	We will evaluate this target using STA 5167, a required course for statistics MS students that is offered once per year. The STA 5167 syllabus contains a data analysis course project and a project presentation. The data analysis course project contains a written report of the data and problem, the actual data analysis and its conclusions. The graduate director will contact the course instructor at the beginning of the Fall semester to obtain the count of how many students took the course in the previous academic year and how many have received a score of 90(/100) or more on their course project and presentation. Our goal is that 85% of the MS students receive a score of 90 or more for that exercise.

Source: FSU Institutional Effectiveness Portal, 2018-19.

Masters in Biostatistics

Outcome Type	Outcome	Assessment & Evaluation Process
Program Outcome: Masters to PhD conversion rate	By the end of the year, the program will classify of its second year students as PhD students.	During their second year of graduate study, master's students have the option of taking our department's PhD qualifying exam. Those that pass this exam may select a doctoral advisor and begin a dissertation. Our goal is that 30% of second year students successfully complete these two steps and become doctoral students within our department.
Learning Outcome: Statistical methods and software	Upon completion of the course of instruction, the student will be able to employ modern statistical techniques and software effectively to solve problems and analyze data.	Our department offers a graduate professional certificate in statistical data analysis in cooperation with the company that produces SAS, a leading statistical software package. The certificate consists of successful completion of a certificate specific graduate course and three additional graduate courses emphasizing data analysis via software. Additionally, each student must prepare a written portfolio of software-driven data analyses. This certificate is at the master's level of difficulty. We will measure

		success in this learning outcome by attaining a completion rate of 33% among our graduate students for this certificate.
Learning Outcome: Statistical methods and software	Upon completion of the course of instruction, the student will be able to demonstrate broad graduate level knowledge and skills from relevant outside fields and topic mastery; e.g., computer science and statistics for both programs, with economics, finance and risk management for Financial Mathematics, and with biochemistry, chemistry, biological science and physics for Biomathematics, if the student is in a professional degree program.	Statistics office staff will look up the student records at the beginning of the Fall semester. They will count how many students received the MS degree at the FSU main campus in the previous academic year and how many obtained a SAS certificate. The certificate consists of successful completion of a certificate specific graduate course, three additional graduate courses emphasizing data analysis via software and a written portfolio of software-driven data analyses. Our goal is that 35% of the MS students have obtained the SAS certificate.
Learning Outcome: Ability to communicate statistical analyses	Upon completion of the course of instruction, the student will be able to express statistical results and inferences in writing to both technical and non-technical audiences.	Communication skills are analyzed through written work required of all students in the biostatistics MS program. Each student must write two projects in each of STA 5106 and STA 5107 (Computational Statistics I and II) on a relevant statistical topic. Students must pass these courses to obtain an MS in biostatistics. Additionally, we will require that the students analyze their projects using real world data, rather than textbook sets. In particular, we will begin using data brought to our department's statistical consulting center. This will ensure that the analyses and presentations made by these students are timely and relevant. Our goal is that 95% of the students receive a score of 88 or more.

Source: FSU Institutional Effectiveness Portal, 2018-19.

Bachelors in Statistics

Outcome Type	Outcome	Assessment & Evaluation Process
Program Outcome: Production of Graduates	By completion of the program, undergraduate majors will have gained the knowledge of the theories of statistics and the ability to apply statistical methods including the use of statistical software so that they are able to the skills they have learned in the job force (academia, government, or industry) or in graduate study.	The undergraduate director will administer an online survey to graduating statistics majors when the list of graduates becomes available (usually by the middle of each semester). Results will be aggregated at the main campus over all three semesters and aggregated for the academic year. For students who complete the program successfully, we expect 80% or more to gain employment in field or to be accepted into graduate school.
Learning Outcome: Writing statistical decisions (non-technical)	Upon completion of a core undergraduate course, the student will be able to compose a statistical decision in a manner that is appropriate for and understandable by non-technical audiences.	The lead instructor of STA 3024 will develop a course project with a scoring rubric that teaching assistants will apply in evaluating the course project. This will assess the students' ability to take the results of the statistical solution to a problem and produce actionable recommendations written in a non-technical way. STA 3024 was chosen because it is a required core course for statistics majors, introduces the students to the highly-sought-in-the-workplace SAS programming skills, and lends itself nicely to the application of statistical methods for which students can write about conclusions. The course is offered on the main campus in fall and spring semesters and the results will be compiled for the year for reporting. At least 75% of the students must score at or above 80% on this component.
Learning Outcome: Applying	Upon completion of a core undergraduate course, the student will be able to define a problem from an outside area and translate it into an accurately formulated statistical problem.	The lead instructor of STA 3024 will develop guidelines for a course project that will encourage students to think about some topic of this world in statistical terms. A faculty-designed rubric will be applied by teaching assistants to assess the students' ability to communicate in writing how a solution to a real-world problem made be approached using statistical analyses. The course is offered on the main

statistical analysis to problems		campus in fall and spring semesters and the results will be aggregated for the year for reporting. At least 75% of the students must score at or above 80% on this component.
Learning Outcome: Performing comprehensive data analysis	Upon completion of a core undergraduate course, the student will be able to perform a comprehensive data analysis consisting of multiple investigations and interpretations of a data set.	The lead instructor of STA 3024 will develop a course project with a multi-item rubric that teaching assistants will apply in evaluating a project. This will evaluate the students' ability to select appropriate statistical tools for the application at hand as well as create and organize a complete statistical analysis. STA 3024 was selected because it is a core course for statistics majors and contains a project that threads its way all through the semester giving students an idea of what is involved in a comprehensive analysis. The course is offered on the main campus in fall and spring semesters and the results will be summarized for the year for reporting. At least 75% of the students must score at or above 80% on this component.
Learning Outcome: Writing statistical analyses of problems	Upon completion of core undergraduate courses, the student will be able to produce a written explanation of a complex problem from a discipline outside of statistics in a manner that explains the essence of the problem in a non-technical way. This will be assessed upon completion of core undergraduate courses.	The lead instructor of STA 3024 will develop a course project with a scoring rubric that teaching assistants will use in evaluating the course project. This will assess the students' ability in using written communications to break down discipline-specific issues in a conceptual way. Fall and spring semester aggregate results will be reported as the course is offered twice during the year on the main campus. At least 75% of the students must score at or above 80% on this component.
Learning Outcome: Using statistical software	Upon completion of a core undergraduate course, the student will be able to apply modern statistical software to implement statistical methods, analyze data, and solve problems.	The lead instructor of STA 3024 will design several embedded data analysis assignments requiring the use of statistical software. Corresponding rubrics will also be designed by the lead instructor that will allow the teaching assistants grading the assignments to also assess all elements of this outcome, determining the students' ability to use statistical software to analyze data and solve problems. STA 3024 is the ideal course for this because it is a required core course for statistics majors, focuses on the SAS programming language, and is the main step in becoming SAS-certified, a highly-valued credential in several organizations. Summarized results will be derived from the two yearly course offerings (fall and spring semesters) on the main campus. At least 75% of the students must score at or above 80% on this component.
Learning Outcome: Presenting statistical conclusions (non-technical)	Upon completion of core undergraduate courses, the student will be able to interpret the conclusions of a statistical study in an oral presentation in such a way that non-technical audiences may understand it.	The lead instructor of STA 3024 will develop guidelines for an oral presentation of the completed course project. The lead instructor will also develop an appropriate rubric and evaluate all class presentations using it. The course is offered on the main campus in fall and spring semesters and the results will be aggregated for the year for reporting purposes. At least 75% of the students must score at or above 80% on this component.
Learning Outcome: Presenting statistical analysis orally	Upon completion of a core undergraduate course, the student will be able to logically discuss the elements of a statistically analysis in an oral presentation to an audience.	The lead instructor of STA 3024 will develop guidelines for an oral presentation of the completed course project. The lead instructor will also develop an appropriate rubric and evaluate all class presentations using it. The course is offered in the fall and spring semesters on the main campus and the scores will be aggregated across the year for reporting purposes. At least 75% of the students must score at or above 80% on this component.

Source: FSU Institutional Effectiveness Portal, 2018-19.