The Bachelor of Science in Mathematics is designed to provide a solid computational and conceptual foundation, on which further mathematical development can be built, within a mathematics intensive career or continued study in graduate school.

**Program Goals**

1) To demonstrate functional competence in a range of computational tools and methods.
2) To develop a conceptual framework encompassing these tools and methods, utilizing the language and structures of mathematics.
3) To be able to apply mathematics to real-world situations and to communicate mathematical ideas effectively.

**Student Learning Outcomes**

1) Demonstrate basic computational competence in elementary analysis (calculus, differential equations) and abstract and linear algebra. (“How do I do this problem?”)

2) Demonstrate understanding of the conceptual frameworks of these topics, with some understanding of their underlying mathematical structure; demonstrate an ability to construct mathematical proofs. (“What does this problem mean? Why are these techniques valid?”)

3) Relate these subject areas to applications in the natural or social sciences, engineering, or other areas of mathematics (“What is this good for?”)

4) Write, analyze and communicate in a lucid and critical manner.

5) Have a sense of the broader mathematical culture. (“What is mathematics? What is its role in society? How do mathematicians think?”)

**Process for Assessing each Student Learning Outcome**

1. **Timeline for assessment and analysis**
See (2) below. Much of our means of assessment is on an ongoing basis through the Departmental Undergraduate Committee’s annual evaluation of our STEM and major undergraduate courses.

2. Means of assessment and desired level of student achievement

Outcomes (1-3) is evaluated within the courses themselves, through examinations, written homework, etc. on an ongoing basis, assessed annually by the Departmental Undergraduate Committee.

Outcome (1) is generally evaluated through computational problems in many of our mathematics courses. The effectiveness of our courses will be reflected in the quality of the work of the students, assessed annually by the Departmental Undergraduate Committee.

Outcome (2) is generally evaluated in our 3000-level and higher level courses, as we begin to ask students to demonstrate rigor and provide more open ended narrative exposition, in the formal language of mathematics. The effectiveness of these courses is self-evident to faculty involved in upper level mathematics instruction - Are our students able to function in that setting? - and is to be assessed annually by the Departmental Undergraduate Committee.

Outcome (3) is evaluated through application oriented projects and open-ended exercises, in applied courses and as topics within a wide range of other courses. The effectiveness of our courses will be reflected in the quality of the work of the students, assessed annually by the Departmental Undergraduate Committee.

Outcome (4) is evaluated throughout the student’s undergraduate career, through written open-ended exercises. The primary evaluation occurs in our senior capstone course, in which the student produces a lengthy paper on a mathematical topic of their choice. The effectiveness of our program overall will be reflected in the quality of the work of these theses, assessed annually by the Departmental Undergraduate Committee.

Outcome (5) is evaluated through overall levels of participation in a wide range of activities within the department aimed at fostering a sense of the broader mathematical culture: interdisciplinary research projects, career fairs, REU’s, internships, The Math Club, AWSM, Celebration of Mind, tutoring, Putnam Exam, as well as courses such as History of Mathematics.

Terminal Assessment: We currently use the following tools to assess student performance towards the end of the degree program:
a) A comprehensive exit examination developed by the Mathematical Association of America.

b) Exit interviews with all graduating seniors.

c) A senior seminar, capstone course, with a senior paper as the primary outcome.

3. Reporting of results

Results will be reported annually to the Dean of Fulbright College.
Program Goals

1) To demonstrate functional competence in a range of computational tools and methods, with applications to a wide range of disciplines and settings.

2) To develop a conceptual framework encompassing these tools and methods, utilizing the language and structures of mathematics.

3) To communicate mathematical ideas effectively, particularly for students obtaining a second degree in another discipline.

Student Learning Outcomes

1) Demonstrate basic computational competence in elementary analysis (calculus, differential equations) and abstract and linear algebra. (“How do I do this problem?”)

2) Demonstrate understanding of the conceptual frameworks of these topics, with some understanding of their underlying mathematical structure; demonstrate an ability to construct mathematical proofs. (“What does this problem mean? Why are these techniques valid?”)

3) Relate these subject areas to applications in the natural or social sciences, engineering, or other areas of mathematics (“What is this good for?”)

4) Write, analyze and communicate in a lucid and critical manner.

5) Have a sense of the broader mathematical culture (“What is mathematics? What is its role in society? How do mathematicians think?”)

Process for Assessing each Student Learning Outcome

1. Timeline for assessment and analysis

See (2) below. Much of our means of assessment is on an ongoing basis through the Departmental Undergraduate Committee’s annual evaluation of our STEM and major undergraduate courses.
2. Means of assessment and desired level of student achievement

Outcomes (1-3) will be evaluated within the courses themselves, through examinations, written homework, etc. on an ongoing basis, assessed annually by the Departmental Undergraduate Committee.

Outcome (1) is generally evaluated through computational problems in many of our mathematics courses. The effectiveness of our courses will be reflected in the quality of the work of the students, assessed annually by the Departmental Undergraduate Committee.

Outcome (2) is generally evaluated in our 3000-level and higher level courses, as we begin to ask students to demonstrate proofs and provide more open ended narrative exposition, in the formal language of mathematics. The effectiveness of these courses is self-evident to faculty involved in upper level mathematics instruction - Are our students able to function in that setting? - and is to be assessed annually by the Departmental Undergraduate Committee.

Outcome (3) will be evaluated through application oriented projects and open-ended exercises, in applied courses and as topics within a wide range of other courses. The effectiveness of our courses will be reflected in the quality of the work of the students, assessed annually by the Departmental Undergraduate Committee.

Outcome (4) will be evaluated throughout the student’s undergraduate career, through written open-ended exercises. The primary evaluation occurs in our senior capstone course, in which the student produces a lengthy paper on a mathematical topic of their choice. The effectiveness of our program overall will be reflected in the quality of the work of these theses, assessed annually by the Departmental Undergraduate Committee.

Outcome (5) will be evaluated through overall levels of participation in a wide range of activities within the department aimed at fostering a sense of the broader mathematical culture: interdisciplinary research projects, career fairs, REU’s, internships, The Math Club, AWSM, Celebration of Mind, tutoring, the Putnam Exam, as well as courses such as History of Mathematics.

Terminal Assessment: We currently use the following tools to assess student performance towards the end of the degree program:

a) A comprehensive exit examination developed by the Mathematical Association of America.

b) Exit interviews with all graduating seniors.
c) A senior seminar, capstone course, with a senior paper as the primary outcome.

3. **Reporting of results**

   Results will be reported annually to the Dean of Fulbright College.
Academic Assessment Plan

Master of Science in Mathematics

May 31, 2016

Program Goals

The Master of Sciences in Mathematics is primarily for the future college educator, broadening the student’s mathematics education beyond that of a BA or BS degree. There is an emphasis on further strengthening abstract and conceptual tools, exposing the student to a wide variety of mathematical topics.

1) Be able to frame abstract arguments and produce mathematical proofs.

2) Demonstrate an understanding of a variety of advanced topics, such as real analysis, complex analysis, abstract algebra, and topology.

3) Demonstrate an ability to articulate the context and meaning of these topics.

Student Learning Outcomes

1) Demonstrate advanced computational competence in analysis, algebra, differential equations, statistics and other specialized areas of mathematics.

2) Demonstrate understanding of the conceptual frameworks and underlying structure of these topics; clearly demonstrate an ability to construct mathematical proofs.

3) Relate these subject areas to applications in the natural or social sciences, engineering, or other areas of mathematics.

4) Write, analyze and communicate in a lucid and critical manner, for a wide range of potential mathematics intensive careers, including collegiate level teaching.

5) Have a sense of the broader mathematical culture.

Process for Assessing each Student Learning Outcome

1. Timeline for assessment and analysis

See (2) below. Much of our means of assessment is on an ongoing basis through the Departmental Graduate Committee’s annual evaluation of our graduate courses.
2. Means of assessment and desired level of student achievement

Outcomes (1-3) will be evaluated within the courses themselves, through examinations, written homework, etc. on an ongoing basis, assessed annually by the Departmental Graduate Committee.

Outcome (1) is generally evaluated through computational problems in the 4000- and higher level courses. The effectiveness of our courses will be reflected in the quality of the work of the students, assessed annually by the Departmental Graduate Committee.

Outcome (2) is evaluated in our graduate level courses, all of which are proof-intensive. The effectiveness of these courses is self-evident to faculty involved in upper level mathematics instruction - Are our students able to function in that setting? - and is to be assessed annually by the Departmental Graduate Committee.

Outcome (3) will be evaluated through application oriented projects and open-ended exercises, in applied courses and as topics within a wide range of other courses. The effectiveness of our courses will be reflected in the quality of the work of the students, assessed annually by the Departmental Graduate Committee.

Outcome (4) will be evaluated throughout the student’s graduate career, through written open-ended exercises. The primary evaluation occurs in comprehensive Masters Exams, described below. The effectiveness of our program overall will be reflected in the quality of the exams, assessed annually by the Departmental Graduate Committee.

Outcome (5) will be evaluated through overall levels of participation in a wide range of activities within the department aimed at fostering a sense of the broader mathematical culture: interdisciplinary research projects, career fairs, internships, AWSM, Celebration of Mind, and tutoring.

Terminal Assessment:

We currently use a comprehensive battery of exit examinations in the cornerstone topics of analysis, algebra and topology.

3. Reporting of results

Results will be reported annually to the Dean of Fulbright College.
Academic Assessment Plan

Master of Arts in Secondary Mathematics

May 31, 2016

The Master of Arts in Mathematics is primarily intended for the secondary or small college educator, broadening the student’s mathematics education beyond that of a BA degree. There is an emphasis on further strengthening abstract and conceptual tools, exposing the student to a wide variety of mathematical topics, and preparing the student to bring mathematical thought to the mathematics classroom.

Program Goals
There is an emphasis on further strengthening abstract and conceptual tools, exposing the student to a wide variety of mathematical topics, and preparing the student to bring mathematical thought to the lower-level classroom. To this end the student should:

1) Be able to frame abstract arguments and produce mathematical proofs.

2) Demonstrate an understanding of a variety of advanced topics, such as advanced calculus and abstract algebra, connecting them to the secondary school curriculum.

3) Demonstrate an ability to articulate the context and meaning of these topics.

4) Write, analyze and communicate in a lucid and critical manner.

Student Learning Outcomes

1) Demonstrate computational competence in analysis, algebra, statistics and other areas of mathematics relevant to the secondary mathematics curriculum.

2) Demonstrate understanding of the conceptual frameworks and underlying structure of these topics; clearly demonstrate an ability to construct mathematical proofs.

3) Relate these subject areas to applications in the natural or social sciences, engineering, or other areas of mathematics at a level appropriate to the secondary mathematics curriculum.

4) Write, analyze and communicate in a lucid and critical manner, particularly in a manner appropriate for the secondary mathematics classroom.

5) Have a sense of the broader mathematical culture.
Process for Assessing each Student Learning Outcome

1. Timeline for assessment and analysis

See (2) below. Much of our means of assessment is on an ongoing basis through the Departmental Graduate Committee’s annual evaluation of our graduate courses.

2. Means of assessment and desired level of student achievement

Outcomes (1-3) will be evaluated within the courses themselves, through examinations, written homework, etc. on an ongoing basis, assessed annually by the Departmental Graduate Committee.

Outcome (1) is generally evaluated through computational problems in the courses for this degree program. The effectiveness of our courses will be reflected in the quality of the work of the students, assessed annually by the Departmental Graduate Committee.

Outcome (2) is evaluated in courses for this degree program, all of which are proof-intensive and is to be assessed annually by the Departmental Graduate Committee.

Outcome (3) is evaluated in courses for this degree program, all of which are proof-intensive and is to be assessed annually by the Departmental Graduate Committee.

Outcome (4) will be evaluated throughout the student’s graduate career, through written open-ended exercises. The primary evaluation occurs in comprehensive Masters Exams, described below and a capstone project. The effectiveness of our program overall will be reflected in the quality of the work of these projects and exams, assessed annually by the Departmental Undergraduate Committee.

Outcome (5) will be evaluated through overall levels of participation in a wide range of activities within the department aimed at fostering a sense of the broader mathematical culture: interdisciplinary research projects, career fairs, internships, AWSM, Celebration of Mind, and tutoring.

Terminal Assessment:
We currently use a comprehensive battery of exit examinations in the cornerstone topics of analysis, algebra and topology as well as a portfolio or final project.

3. Reporting of results

Results will be reported annually to the Dean of Fulbright College.
Academic Assessment Plan

Doctor of Philosophy in Mathematics

May 31, 2016

Program Goals

The Doctor of Philosophy in Mathematics aims to establish a student in a research level mathematics career, within academia or industry. To that end the student should demonstrate:

1) An ability to undertake original research level mathematical investigation.

2) Mathematical breadth and sophistication in the foundational subject areas of analysis, algebra and topology.

3) An understanding of the field of specialization, its context, structure, and literature.

4) An ability to write, discuss and lecture at a research level.

Student Learning Outcomes

1) An ability to undertake original research level mathematical investigation.

2) Mathematical breadth and sophistication in the foundational subject areas of analysis, algebra and topology.

3) An understanding of the field of specialization, its context, structure, and literature.

4) An ability to write, discuss and lecture at a research level.

Process for Assessing each Student Learning Outcome

1. Timeline for assessment and analysis

   Continual.

2. Means of assessment and desired level of student achievement

The Ph.D. program is aimed squarely at these outcomes. Our graduating Ph.D. students, by passing their qualifying exams and producing a thesis demonstrate outcomes (1-4), and this is assessed continually by our Departmental Graduate Committee, our faculty, and our peers.
3. **Reporting of results**

Results will be reported annually to the Dean of Fulbright College.