Undergraduate Degree Program
Program - CASE Mathematical Sciences SLO (BS)

Mission Statement

Outcomes
FIU graduates should be able to achieve the following:

<table>
<thead>
<tr>
<th>Content Knowledge and Skills (including Technology)</th>
<th>Direct Measures</th>
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<tbody>
<tr>
<td><strong>Math Major: Content Knowledge</strong></td>
<td><strong>Procedure:</strong></td>
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<tr>
<td>Graduates will be able to write and critique</td>
<td><strong>Assessment Instrument:</strong> Closed-ended Exam</td>
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<tr>
<td>mathematical proofs of statements about the</td>
<td><strong>Assessment Method:</strong> The exam will assess the following</td>
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<tr>
<td>structure of mathematical theories.</td>
<td>indicators of subject knowledge:</td>
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<td></td>
<td>- Demonstrates a core knowledge of Calculus, and Elementary</td>
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<td>- Identifies basic theories, structures, and computational</td>
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<td>- Applies theories and techniques associated with the core</td>
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<td>- Applies general mathematical models and theories and</td>
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<td></td>
<td>- Applies mathematical models and theories and</td>
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<td></td>
<td>- Analyzes and critiques proofs and solutions to problems</td>
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<td>for correctness</td>
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<td>Fall exam consists of 6 problems that are worth 5 points each.</td>
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<td>Spring exam consists of 6 problems that are worth 10 points each.</td>
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<td><strong>Course Assessed:</strong></td>
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<td></td>
<td><strong>Sampling:</strong> An Exit Exam will be given to all students in the</td>
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<td><strong>Minimum Criteria for Success:</strong> Graduates will attain a minimum</td>
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<td><strong>Senior Seminar in Mathematics.</strong></td>
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<td>average score of 70% on subject knowledge.</td>
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</table>

| **Statistics Major: Content Knowledge**             | **Procedure:**  |
| Graduates will understand the principles of         | **Assessment Instrument:** Rubric                        |
| parametric and nonparametric statistics, design     | **Assessment Method:** All graduating students will be required to |
| an experiment and collect data, and analyze the     | take the capstone course, STA 3951. The course requires the |
| results using the appropriate statistical           | students to design a study and analyze relevant results   |
| techniques.                                        | (henceforth referred to as the senior project). They present the |
|                                                     | results of the study in a written report at the end of the   |
|                                                     | semester as well through an oral presentation.              |
|                                                     | A three-member faculty panel will use the rubric describing 4 |
|                                                     | indicators of subject knowledge (5-point rating scale; 20-point |
|                                                     | maximum) to assess the research paper required in the       |
|                                                     | capstone course. A mean score for each student will be      |
|                                                     | obtained from faculty ratings.                               |
|                                                     | **Course Assessed:**                                        |
|                                                     | **Sampling:** A sample of 10% of graduating students or a    |
## Critical Thinking

### All Majors: Critical Thinking

Students will be able to evaluate the correctness and relevance of mathematical statements, mathematical proofs, and computations.

### Math Major: Critical Thinking

Graduates will be able to evaluate the correctness and relevance of mathematical proofs and computations.

### Statistics Major: Critical Thinking

B. S. graduates will be able to identify and summarize a problem or question, analyze and examine ideas and research findings, assess the influence of context, and construct and interpret information within Statistics.

### Direct Measures

#### Procedure:

**Assessment Instrument:** Other (Name Instrument and Describe Below)

**Assessment Method:** The students will be presented with a mathematical statement as well as an invalid proof of that statement. The students will be asked (1) to determine what is erroneous in the purported proof or computations contained within that proof, or missing from the purported proof or computations contained within that proof and (2) to determine whether the mathematical statement is true or false, and (3) to correct the proof (and any computation contained within that proof) if the statement is true, and provide a counterexample if the statement is false. This will be graded on a scale of 0 to 10 by three faculty members, and the results averaged. The 10 points will be distributed as follows: Part (1): 4 points; Part (2): 3 points; Part (3): 3 points.

**Course Assessed:** MAT 4934, MAP 4104C

**Sampling:** All students enrolled in MAT 4934 and all students enrolled in MAP 4104C will encounter this part of their exit exam. All mathematical science BS majors are required to pass either MAT 4934 or MAP 4104C.

**Minimum Criteria for Success:** 6 points on a scale of 10.

#### Math Major: Critical Thinking

**Procedure:**

**Assessment Instrument:** Closed-ended Exam

**Assessment Method:** A three-member faculty panel will use a rubric describing 4 indicators of critical thinking skills (5-point rating scale; 20-point maximum) to assess students' performance on an expository essay.

Indicators will include:
- Identifies & summarizes the problem/question
- Analyzes & examines
- Assesses the influence of context
- Constructs and interprets

**Course Assessed:**

**Sampling:** All graduating students will be evaluated when they make their presentation in the senior seminar or in the math modeling class.

**Minimum Criteria for Success:** A mean score for each student will be obtained from the faculty ratings. Graduates will attain an average minimum score of 12 on critical thinking.

#### Statistics Major: Critical Thinking

**Procedure:**

**Assessment Instrument:** Rubric

**Assessment Method:** All graduating students will be required to take the capstone course, STA 3951. The course requires the students to design a study and analyze relevant results (henceforth referred to as the senior project). They present the results of the study in a written report at the end of the semester as well through an oral presentation.

A three-member faculty panel will use the attached rubric.
describing 4 indicators of critical thinking (5-point rating scale; 20-point maximum) to assess the research paper required in the capstone course.

A mean score for each student will be obtained from the faculty ratings.

**Course Assessed:**

**Sampling:** A sample of 10% of graduating students or a minimum of 10 students (whichever is higher) will be assessed in the capstone course, STA 3951, each semester.

**Minimum Criteria for Success:** Graduates will attain an average minimum score of 12 on critical thinking.

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**Communication (Oral or Written)**

### Math Major: Communication Skills - Oral

Students will be able to orally communicate subject knowledge of Mathematics, organization of ideas, adequate connection to an audience, efficient delivery.

### Math Major: Communication Skills - Written

Graduates will be able to write appropriate content, organize statements, make effective use of language, logic, and standard mathematical notations, and use scientific editors such as TEX to present their work.

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**Statistics Major: Communication Skills - Oral**

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**Procedure:**

**Assessment Instrument:** Rubric

**Assessment Method:** A three-member faculty panel will use a rubric describing 4 indicators of oral communication skills (5-point rating scale; 20-point maximum) to assess students' performance on an oral presentation based on the expository essay.

Indicators will include:

- Subject knowledge
- Organization
- Connection to audience
- Delivery

**Course Assessed:**

**Sampling:** All graduating seniors will be evaluated when they make their presentation in the senior seminar or in the math modeling class.

**Minimum Criteria for Success:** A mean score for each student will be obtained from the faculty ratings. Graduates will attain an average minimum of 12-points on the oral communication rubric.

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**Direct Measures**

**Math Major: Communication Skills - Oral**

**Procedure:**

**Assessment Instrument:** Rubric

**Assessment Method:** A three-member faculty panel will use a rubric describing 4 indicators of oral communication skills (5-point rating scale; 20-point maximum) to assess students' performance on an oral presentation based on the expository essay.

Indicators will include:

- Subject knowledge
- Organization
- Connection to audience
- Delivery

**Course Assessed:**

**Sampling:** A sample of 10% of graduating students or a minimum of 10 students (whichever is higher) will be assessed in the capstone course, STA 3951, each semester.

**Minimum Criteria for Success:** Graduates will attain an average minimum score of 12 on critical thinking.

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**Math Major: Communication Skills - Written**

**Procedure:**

**Assessment Instrument:** Rubric

**Assessment Method:** A three-member faculty panel will use a rubric describing 4 indicators of written communication skills (5-point rating scale; 20-point maximum) to assess students' performance on an expository essay.

Indicators will include:

- Content & development
- Organization
- Language
- Conventions [inc. appropriate use of technology]

**Course Assessed:**

**Sampling:** All graduating seniors will be evaluated when they make their presentation in the senior seminar or in the math modeling class.

**Minimum Criteria for Success:** A mean score for each student will be obtained from the faculty ratings. Graduates will attain an average minimum score of 12-points on the written communication rubric.
Students will be able to orally communicate subject knowledge of Mathematics, organization of ideas, adequate connection to an audience, and efficient delivery.

**Assessment Instrument:** Rubric

**Assessment Method:** All graduating students will be required to take the capstone course, STA 3951. The course requires the students to design a study and analyze relevant results (henceforth referred to as the senior project). They present the results of the study in a written report at the end of the semester as well through an oral presentation.

A three-member faculty panel will use the attached rubric describing 4 indicators of oral communication skills, 1. subject knowledge of Statistics, 2. organization of ideas, 3. adequate connection to an audience, and 4. efficient delivery, (5-point rating scale; 20-point maximum) to assess the oral presentation required in the capstone course (or name requirement and course).

A mean score for each student will be obtained from the faculty ratings.

**Course Assessed:**

**Sampling:** A sample of 10% of graduating students or a minimum of 10 students (whichever is higher) will be assessed in the capstone course, STA 3951, each semester.

**Minimum Criteria for Success:** Graduates will attain an average minimum of 12 points on the oral communication rubric.

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**Statistics Major: Communication Skills-Written**

B.S. graduates will demonstrate written communication skills in Statistics by explaining content and developing ideas, effectively organizing information, demonstrating a command of the written language, and using the conventions of language and documentation appropriately.

**Assessment Instrument:** Rubric

**Assessment Method:** All graduating students will be required to take the capstone course, STA 3951. The course requires the students to design a study and analyze relevant results (henceforth referred to as the senior project). They present the results of the study in a written report at the end of the semester as well through an oral presentation.

A three-member faculty panel will use the attached rubric describing 4 indicators of written communication skills, 1. explaining content and developing ideas, 2. effectively organizing information, 3. demonstrating a command of the written language, and 4. using the conventions of language and documentation appropriately, (5-point rating scale; 20-point maximum) to assess the research paper required in the capstone course.

A mean score for each student will be obtained from the faculty ratings.

**Course Assessed:**

**Sampling:** A sample of 10% of graduating students or a minimum of 10 students (whichever is higher) will be assessed in the capstone course, STA 3951, each semester.

**Minimum Criteria for Success:** Graduates will attain an average minimum score of 12 points on the written communication rubric.