### Undergraduate Degree Program

**Mechanical Engineering - BS**

#### Mission Statement
The curriculum is designed to give students a thorough understanding of the basic laws of science and simultaneously to stimulate and develop creative thinking, a professional attitude, economic judgment and environmental consciousness.

#### Student Learning Outcomes
**FIU Mechanical Engineering - BS graduates should be able to achieve the following:**

<table>
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<tr>
<th>Content/Discipline Knowledge Skills</th>
<th>Direct Measures</th>
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<tbody>
<tr>
<td>At the time of graduation, a Mechanical Engineering student will have the ability to apply knowledge of mathematics including statistics, multivariable calculus and differential equations, science including physics, and engineering.</td>
<td><strong>Procedure:</strong> Senior Design Presentation Evaluation: Ten-member industrial advisory board (IAB) and faculty will separately evaluate senior design students' final presentation every spring and fall semester. Local CEOs, experienced engineers and managers will make up the IAB. The evaluation will specifically collect feedback on technical knowledge of students, and students’ explanation of technical content. Evaluation will use a five-point Likert scale (5 expert, 4 proficient, 3 apprentice, 2 novice, 1 non-responsive).</td>
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</table>

**Sampling:** All students in the Senior Design Project class will be assessed.

**Minimum Criteria for Success:** Departmental goal will be to reach an average score of 3.5 or better for each team. All students in the Senior Design Project class will be assessed.
Fundamentals of Engineering (FE) Style Exam: Senior students taking the required Ethics and Senior Design Organization course will be given six FE style exams to assess their preparedness similar to the nationally administered FE exam.

**Sampling:**
Performance of all students will be used in this assessment.

**Minimum Criteria for Success:**
Students receiving an average score of 70% or better on six tests will meet expectations similar to the FE exam format adopted nationally by the National Council of Examiners for Engineering and Surveying to issue licensure to professional engineers.

**Procedure:**
Senior Design Report Evaluation: Ten-member industrial advisory board (IAB) and faculty will separately evaluate senior design students' final presentation and report every spring and fall semester. Local CEOs, experienced engineers and managers will make up the IAB. The evaluation will specifically ask for feedback on (a) designing and conducting experiments, and (b) analysis and evaluation of experimental data. Evaluation will use a five-point Likert scale (5 expert, 4 proficient, 3 apprentice, 2 novice, 1 non-responsive).

**Sampling:**
All students in the Senior Design Project class will be assessed.

**Minimum Criteria for Success:**
Departmental goal will be to reach an average score of 3.5 or better for each team.

### Experiments and Data
At the time of graduation, a Mechanical Engineering student will have the ability to design and conduct experiments, as well as to analyze and interpret data.

### System Design
At the time of graduation, a Mechanical Engineering student will have the ability to design a system, component or process to meet desired needs.
At the time of graduation, a Mechanical Engineering student will have the ability to design a system, component or process to meet desired needs.

Senior Design Report Evaluation: Ten-member industrial advisory board (IAB) and faculty will separately evaluate senior design students’ final presentation and report every spring and fall semester. Local CEOs, experienced engineers and managers will make up the IAB. Report evaluation will directly assess (1) design solution formulation (component and process design) and creativity, (2) feasibility assessment, and (3) detailed design. The evaluation will collect feedback on (a) design solution formulation (component and process design) and creativity, (b) feasibility assessment, and (c) detailed design. Evaluation will use a five-point Likert scale (5 expert, 4 proficient, 3 apprentice, 2 novice, 1 non-responsive).

### Sampling:
All students in the Senior Design Project class will be assessed.

### Minimum Criteria for Success:
Departmental goal will be to reach an average score of 3.5 or better for each team.

### Procedure:
Senior Design Report Evaluation: Ten-member industrial advisory board (IAB) and faculty will separately evaluate senior design students’ final report every spring and fall semester. Local CEOs, experienced engineers and managers will make up the IAB. The senior design report evaluation will ask for the evaluation of quality of teamwork as displayed in the report. Each evaluation will use a five-point Likert scale (5 expert, 4 proficient, 3 apprentice, 2 novice, 1 non-responsive).

### Sampling:
All students in the Senior Design Project class will be assessed.

### Minimum Criteria for Success:
Departmental goal for each evaluated area will be to reach an average score of 3.5 or better for each team. All students in Senior Design Project class will be assessed.

**Procedure:**
Senior Design Presentation Evaluation: Ten-member industrial advisory board (IAB) and faculty will separately evaluate senior design students’ final presentation every spring and fall semester. Local CEOs, experienced engineers and managers will make up the IAB. Presentation evaluation will ask for the evaluation of multi-disciplinary nature and effectiveness of teamwork as demonstrated by the team. Each evaluation will use a five-point Likert scale (5 expert, 4 proficient, 3 apprentice, 2 novice, 1 non-responsive).

**Sampling:**
All students in the Senior Design Project class will be assessed.

**Minimum Criteria for Success:**
Departmental goal for each evaluated area will be to reach an average score of 3.5 or better for each team. All students in Senior Design Project class will be assessed.

### Professional and Ethical Responsibility:
At the time of graduation, a Mechanical Engineering student will have an understanding of professional and ethical responsibility.

**Procedure:**
Senior Design Report Evaluation: Ten-member industrial advisory board (IAB) and faculty will separately evaluate senior design students’ final report every spring and fall semester. Local CEOs, experienced engineers and managers will make up the IAB. IAB members and faculty will directly evaluate students on ethical conduct and ethics statement. Students will include an ethics statement and sign it. Evaluation will use a five-point Likert scale (5 expert, 4 proficient, 3 apprentice, 2 novice, 1 non-responsive).

**Sampling:**
All students in the Senior Design Project class will be assessed.

**Minimum Criteria for Success:**
Departmental goal will be to reach an average score of 3.5 or better for each team. All students in the Senior Design Project class will be assessed.

**Procedure:**
Senior Design Presentation Evaluations: Ten-member industrial advisory board (IAB) and faculty will separately evaluate senior design students' final presentations every spring and fall semester. Local CEOs, experienced engineers and managers will make up the IAB. The evaluators will interpret the overall design experience on how it impacts students' life-long learning. Each evaluation will use a five-point Likert scale (5 expert, 4 proficient, 3 apprentice, 2 novice, 1 non-responsive).

**Sampling:**
All students in the Senior Design Project class will be assessed.

**Minimum Criteria for Success:**
Departmental goal will be to reach an average score of 3.5 or better for each assessment area.

**Procedure:**
Senior Design Report Evaluations: Ten-member industrial advisory board (IAB) and faculty will evaluate final reports every spring and fall semester. The evaluation will assess the (a) recognition of need, and (b) exhibition of an understanding of life-long learning. Each evaluation will use a five-point Likert scale (5 expert, 4 proficient, 3 apprentice, 2 novice, 1 non-responsive).

**Sampling:**
All students in the Senior Design Project class will be assessed.

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### Contemporary Knowledge:
At the time of graduation, a Mechanical Engineering student will have an understanding of the knowledge of contemporary issues.

### Procedure:
Senior Design Report Evaluations: Ten-member industrial advisory board (IAB) and faculty will separately evaluate final reports every spring and fall semester. Local CEOs, experienced engineers and managers will make up the IAB. The evaluation will assess contemporary context in design work. Each evaluation will use a five-point Likert scale (5 expert, 4 proficient, 3 apprentice, 2 novice, 1 non-responsive).

### Sampling:
All students in the Senior Design Project class will be assessed.

### Minimum Criteria for Success:
Departmental goal will be to reach an average score of 3.5 or better for each assessment area.

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### Global:
At the time of graduation, a Mechanical Engineering student will have an understanding of broad education necessary to understand the impact of engineering solutions in a global and societal context.

### Procedure:
Ten-member industrial advisory board (IAB) and faculty will separately evaluate senior design students' final presentations every spring and fall semester. Local CEOs, experienced engineers and managers will make up the IAB. Each evaluation will use a five-point Likert scale (5 expert, 4 proficient, 3 apprentice, 2 novice, 1 non-responsive).

### Sampling:
All students in the Senior Design Project class will be assessed.

### Minimum Criteria for Success:
Departmental goal will be to reach an average score of 3.5 or better for each assessment area.
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<td>Senior Design Report Evaluations: Ten-member industrial advisory board (IAB) and faculty will separately evaluate final reports every spring and fall semester. The evaluation will assess broader knowledge displayed on awareness of social and environmental issues related to the design. Each evaluation will use a five-point Likert scale (5 expert, 4 proficient, 3 apprentice, 2 novice, 1 non-responsive).</td>
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**Ten-member industrial advisory board (IAB) and faculty will separately evaluate senior design students’ final presentation and report every spring and fall semester. Local CEOs, experienced engineers and managers will make up the IAB. Evaluation will use a five-point Likert scale (5 expert, 4 proficient, 3 apprentice, 2 novice, 1 non-responsive). The survey will collect feedback on the use of engineering tools.**

**Sampling:**

At the time of graduation, a Mechanical Engineering student will have the ability to use the techniques, skills and modern engineering tools necessary for engineering practice.
### Critical Thinking Skills
At the time of graduation, a Mechanical Engineering student will have the ability to identify, formulate, and solve engineering problems.

### Direct Measures
**Procedure:**
Ten-member industrial advisory board (IAB) and faculty will separately evaluate senior design students’ final report every spring and fall semester. Local CEOs, experienced engineers and managers will make up the IAB. Evaluation will use a five-point Likert scale (5 expert, 4 proficient, 3 apprentice, 2 novice, 1 non-responsive). The evaluation will collect feedback on (a) problem formulation, (b) formulation of an engineering solution, and (c) engineering analysis and decision-making.

### Minimum Criteria for Success:
Departmental goal will be to reach an average score of 3.5 or better for each team.

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### Communication Skills
At the time of graduation, a Mechanical Engineering student will have the ability to communicate effectively.

### Direct Measures
**Procedure:**

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All students in the Senior Design Project class will be assessed.

**Minimum Criteria for Success:**
Departmental goal will be to reach an average score of 3.5 or better for each team.
have the ability to communicate effectively.

(Assessment of Oral Skills): Senior Design Presentation Evaluations:
Ten-member industrial advisory board (IAB) and faculty will separately evaluate senior design students' final presentations every spring and fall semester. Local CEOs, experienced engineers and managers will make up the IAB. Presentation evaluation will assess oral communication skills. Each evaluation will use a five-point Likert scale (5 expert, 4 proficient, 3 apprentice, 2 novice, 1 non-responsive). Departmental goal will be to reach an average score of 3.5 or better for each assessment area.

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<td>(Assessment of Written Skills): Senior Design Report Evaluations: Ten-member industrial advisory board (IAB) and faculty will separately evaluate final reports every spring and fall semester. Report evaluation will assess written communication skills. Each evaluation will use a five-point Likert scale (5 expert, 4 proficient, 3 apprentice, 2 novice, 1 non-responsive).</td>
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