

# B.S. IN MECHANICAL ENGINEERING/M.S. IN SPORTS ENGINEERING

## Overview

The College of Engineering offers a dual-degree program that culminates with students receiving a Bachelor of Science in Mechanical Engineering and a Master of Science in Sports Engineering concurrently. The program is intended for exceptional students who are admitted to the graduate program in their junior year. Students applying for this program must have a grade point average of at least 3.0. The two degrees are awarded simultaneously when the combined requirements have been met for both degrees.

- Juniors who have maintained at least a 3.0 GPA have the option to apply for admission to the 5-year BS ME-MS BME program.
- Those who are accepted into this accelerated program must maintain at least a 3.0 GPA and a minimum of a 3.0 GPA for the final 30 credit hours.
- Up to 3 credit hours of Technical electives earned during the fourth year can be counted toward the 30 credit hours required for the MS degree.
- Students must be registered for a minimum of 12 undergraduate credit hours per semester in their fourth year.
- Students can register for a maximum of 6 graduate credit hours in each semester of their fourth year.
- If a student needs to withdraw from the BS ME/MS SPEN program then all the requirements for the specific BS Concentration must be completed for graduation with the BS degree.

## Admission Requirements

Juniors in the Mechanical and Aerospace Engineering department of the University of Miami who have maintained at least a 3.0 GPA may apply to the dual degree program. Qualified students are strongly advised to apply to the dual degree program as early as possible in their junior year to facilitate academic advising and course selection in the second semester of their junior year. Students opting for an M.S. degree in a discipline different from their B.S. degree may need to take some prerequisite coursework. Before submitting an application, students should discuss the program and possibility of entering with an academic adviser.

## Curriculum Requirements

Code	Title	Credit Hours
<b>BS IN MECHANICAL ENGINEERING REQUIREMENTS (126 CREDIT HOURS)</b>		
<b>Engineering Courses</b>		
CAE 210	Mechanics of Solids I	3
ECE 205	Principles of Electrical Engineering-I	3
ISE 311	Applied Probability and Statistics	3
EGN 123	Computing and Digital Solutions for the future	3
or EGN 114	Global Challenges Addressed by Engineering and Technology	
or EGN 110	Innovation and Entrepreneurship in Engineering	
MAE 112	Introduction to Engineering II	2
MAE 202	Dynamics	3
MAE 207	Mechanics of Solids II	3
MAE 241	Measurements Laboratory	3
MAE 301	Engineering Materials Science	3
MAE 302	Mechanical Behavior of Materials	3
MAE 303	Thermodynamics	3
MAE 309	Fluid Mechanics	3
MAE 310	Heat Transfer	3
MAE 341	Mechanical Design I	3
MAE 342	Mechanical Design II	3
MAE 351	Mechanics Laboratory	2
MAE 362	Computer Analysis of Mechanical and Aerospace Engineering Problems	3
MAE 404	Experimental Engineering Laboratory	2
MAE 412	System Dynamics	3
MAE 415	Automatic Control	3
MAE 441	Design of Fluid and Thermal Systems	3
MAE 442	Capstone Design Project-I	3

MAE 443	Capstone Design Project-II	3
MAE Technical Electives <sup>1</sup>		6
<b>Math and Science Courses</b>		
MTH 151	Calculus I for Engineers	5
MTH 162	Calculus II	4
MTH 211	Calculus III	3
MTH 311	Introduction to Ordinary Differential Equations	3
CHM 151	Chemistry for Engineers	3
CHM 153	Chemistry Laboratory for Engineers	1
PHY 221	University Physics I	3
PHY 222	University Physics II	3
PHY 223	University Physics III	3
PHY 106	Physics Laboratory 1	1
PHY 108	Physics Laboratory 2	1
<b>General Education Requirements</b>		
Written Communication Skills:		
WRS 105	First-Year Writing I	3
WRS 107	First-Year Writing II: STEM	3
Quantitative Skills:		
MTH 151	Calculus I for Engineers (fulfilled through the major)	
Areas of Knowledge:		
Arts and Humanities Cognate <sup>2</sup>		9
People and Society Cognate <sup>2</sup>		9
STEM Cognate (9 credits) (fulfilled through the major)		
<b>MS IN SPORTS ENGINEERING REQUIREMENTS (30 CREDIT HOURS)</b>		<b>30</b>
Refer to the link below for more information on the MS (Non-Thesis Option) Requirements: <a href="https://bulletin.miami.edu/graduate-academic-programs/engineering/mechanical-aerospace-engineering/sports-engineering-ms/">https://bulletin.miami.edu/graduate-academic-programs/engineering/mechanical-aerospace-engineering/sports-engineering-ms/</a> ( <a href="https://bulletin.miami.edu/undergraduate-academic-programs/engineering/mechanical-aerospace-engineering/text/">https://bulletin.miami.edu/undergraduate-academic-programs/engineering/mechanical-aerospace-engineering/text/</a> )		
<b>Total Credit Hours</b>		<b>156</b>

<sup>1</sup> MAE Technical Electives are chosen from MAE course offerings (300 level & above) with the approval of the advisor

<sup>2</sup> To be selected from the Cognate Search Engine, People and Society (PS)/Arts & Humanities (AH) (or applicable cognates). Students take a minimum of 3 courses (9 credit hours) in AH cognate and 3 courses in PS Cognate (9 credit hours).

## Plan of Study

Freshman Year		Credit Hours
<b>Fall</b>		
EGN 123, 110, or 114	Computing and Digital Solutions for the future or Innovation and Entrepreneurship in Engineering or Global Challenges Addressed by Engineering and Technology	3
WRS 105	First-Year Writing I	3
MTH 151	Calculus I for Engineers	5
PHY 221	University Physics I	3
<b>Credit Hours</b>		<b>14</b>
<b>Spring</b>		
MAE 112	Introduction to Engineering II	2
CAE 210	Mechanics of Solids I	3
WRS 107	First-Year Writing II: STEM	3
MTH 162	Calculus II	4
PHY 222	University Physics II	3
PHY 106	Physics Laboratory 1	1
<b>Credit Hours</b>		<b>16</b>

<b>Sophomore Year</b>		
<b>Fall</b>		
MAE 207	Mechanics of Solids II	3
ISE 311	Applied Probability and Statistics	3
MTH 211	Calculus III	3
PHY 223	University Physics III	3
PHY 108	Physics Laboratory 2	1
PS Cognate (PS Elective) <sup>1</sup>		3
<b>Credit Hours</b>		<b>16</b>
<b>Spring</b>		
MAE 202	Dynamics	3
MAE 241	Measurements Laboratory	3
CHM 151	Chemistry for Engineers	3
CHM 153	Chemistry Laboratory for Engineers	1
MTH 311	Introduction to Ordinary Differential Equations	3
HA Cognate (HA Elective) <sup>1</sup>		3
<b>Credit Hours</b>		<b>16</b>
<b>Junior Year</b>		
<b>Fall</b>		
MAE 302	Mechanical Behavior of Materials	3
MAE 303	Thermodynamics	3
MAE 309	Fluid Mechanics	3
MAE 341	Mechanical Design I	3
ECE 205	Principles of Electrical Engineering-I	3
HA Cognate (HA Elective) <sup>1</sup>		3
<b>Credit Hours</b>		<b>18</b>
<b>Spring</b>		
MAE 301	Engineering Materials Science	3
MAE 310	Heat Transfer	3
MAE 342	Mechanical Design II	3
MAE 351	Mechanics Laboratory	2
MAE 362	Computer Analysis of Mechanical and Aerospace Engineering Problems	3
PS Cognate (PS Elective) <sup>1</sup>		3
<b>Credit Hours</b>		<b>17</b>
<b>Senior Year</b>		
<b>Fall</b>		
MAE 404	Experimental Engineering Laboratory	2
MAE 412	System Dynamics	3
MAE 441	Design of Fluid and Thermal Systems	3
MAE 442	Capstone Design Project-I	3
PS Cognate <sup>1</sup>		3
Graduate Physiology Course <sup>3</sup>		3
<b>Credit Hours</b>		<b>17</b>
<b>Spring</b>		
MAE 443	Capstone Design Project-II	3
MAE 415	Automatic Control	3
HA Cognate (HA Elective) <sup>1</sup>		3
MAE Elective <sup>2</sup>		3
MAE Elective <sup>2</sup>		3
MAE 651	Special Problems	1
BME 725	Special Problems	1

KIN 690	Special Topics in Kinesiology and Sport Sciences	1
<b>Credit Hours</b>		<b>18</b>
<b>Fifth Year (Graduate)</b>		
<b>Fall</b>		
MAE 686 Introduction to Sports Engineering		3
KIN 735	Methods in Biomechanical Analysis	3
Graduate Electives <sup>3</sup>		6
<b>Credit Hours</b>		<b>12</b>
<b>Spring</b>		
MAE 687 Materials in Sports Equipment		3
MAE 751	Master's Project	3
Graduate Electives <sup>3</sup>		6
<b>Credit Hours</b>		<b>12</b>
<b>Total Credit Hours</b>		<b>156</b>

<sup>1</sup> Students must complete 1 People and Society (PS) cognate and 1 Arts and Humanities (AH) cognate, to be selected from the Cognate Search Engine. Each cognate should be a minimum of 3 courses (9 credits)

<sup>2</sup> MAE Technical Electives are chosen from MAE course offerings (300 level & above) with the approval of the advisor.

<sup>3</sup> Graduate Courses must be selected following the curriculum requirements for Sports Engineering. Please consult the program director of Sports Engineering for more guidance.