

EGM 5315	Methods in Mechanical Engineering Intermediate Analysis of Mechanical Systems	3 3	EGN 3311	Statics	3
EGM 5615	Synthesis of Engineering Mechanics	3	Social Science - Group One* (Suggested)		3
EGN 5367	Industrial Materials and Engineering Design	3	EGS 1041	Technology, Humans and Society – GL	3
EMA 3066	Polymer Science and Engineering	3	<b>Fourth Semester: (16)</b>		
EMA 4121	Physical Metallurgy	3	EEL 3110C	Circuits Analysis and Lab	4
EMA4121L	Materials Laboratory	1	MAP 2302	Differential Equations	3
EMA 4223	Mechanical Metallurgy	3	EGN 3321	Dynamics	3
EMA 5295	Principles of Composite Materials	3	EGN 3343	Thermodynamics I	3
EMA 5507C	Analytical Techniques of Material Sciences	3	EIN 3390	Manufacturing Processes	3
EMA 5935	Advanced Topics in Materials Engineering KM	3	<b>Fifth Semester: (16)</b>		
EML 3301C	Instrumentation	3	EGM 3311	Analysis of Engineering Systems	3
EML 4220	Mechanical Vibrations	3	EML 3301L	Instrumentation and Measurement Lab	1
EML 4260	Dynamics of Machinery	3	EMA 3702	Mechanics and Materials Science	3
EML 4535	Mechanical Computer-Aided Design	3	EML 3126	Transport Phenomena	3
EML 4561	Introduction to Electronic Packaging	3	EML 3036	Simulation Software for Mechanical Engineers	3
EML 4840	Robot Design	3	Humanities - Group One*		
EML 4823	Introduction to Sensors and Signal Processing	3	<b>Sixth Semester: (16)</b>		
EML 5125	Classical Dynamics	3	EGN 3613	Engineering Economy	3
EML 5385	Identification Techniques of Mechanical Systems	3	EML 3222	Systems Dynamics	3
EML 5509	Optimization Algorithms	3		Or	
EML 5530	Intermediate CAD/CAE	3	EML 4220	Mechanical Vibrations	3
EML 5562	Advanced Electronic Packaging	3	EML 4140	Heat Transfer	3
EML 5808	Control Technology for Robotic Systems	3	EML 3500	Mechanical Design I	3
			Advanced Core Laboratory		
			Humanities - Group Two*		
			<b>Seventh Semester: (12)</b>		
			EML 4551	Ethics and Design Project Organization – GL	3
			Advanced Core Elective		
			Advanced Core Elective		
			Engineering Elective		
			<b>Eighth Semester: (15)</b>		
			EML 4905	Senior Design Project – GL	3
			Advanced Core Elective		
			Design Elective		
			Engineering Elective		
			Social Science – Group Two*		

Students are required to complete nine credit hours of technical electives, three of which are approved design credits.

Students with special needs may take other elective courses (not listed above) with permission of the Mechanical Engineering Advisor. Students are not restricted to these two concentration areas but may choose courses, with the advisor's consent, that will form a coherent concentration area. Special topics may be counted as an elective.

### Mechanical Engineering Program Requirements— Freshman to Senior

#### First Semester: (17)

MAC 2281	Calculus I for Engineering	4
CHM 1045	General Chemistry I	3
CHM 1045L	General Chemistry I Lab	1
ENC 1101	Writing and Rhetoric I	3
ARTS*		3
EGS 1006	Introduction to Engineering	2
SLS 1501	First Year Experience	1

#### Second Semester: (18)

MAC 2282	Calculus II for Engineering	4
PHY 2048	Physics I with Calculus	4
PHY 2048L	General Physics I Lab	1
ENC 1102	Writing and Rhetoric II	3
EML 2032	Programming for Mechanical Engineers	3
EML 1533	Intro to CAD for Mechanical Engineers	3

#### Third Semester: (18)

EGN 3365	Materials in Engineering	3
MAC 2283	Calculus III for Engineering	4
PHY 2049	Physics with Calculus II	4
PHY 2049L	General Physics II Lab	1

\*Refer to your undergraduate engineering advisor to fulfill this requirement.

### Combined BS/MS in Mechanical Engineering Degree Pathway

Students, who pursue a BS degree and are in their junior year (completed 75 credits), with at least a 3.20 GPA on both overall and upper division courses may apply to enroll in the combined BS/MS pathway. To be considered for admission to the combined bachelor's/master's degree program, students must have completed at least 75-90 credits in the bachelor's degree program at FIU and meet the admissions criteria for the graduate degree program to which they are applying. Students need only apply once to the combined degree pathway; the application is submitted to Graduate Admissions typically before the student starts the last 30 credits of the bachelor's degree program. A student admitted to the combined degree pathway will be considered to have undergraduate status until the student applies for graduation from their bachelor's degree program. Upon conferral of the bachelor's degree, the student will be granted graduate

status and be eligible for graduate assistantships. Only 5000-level or higher courses, and no more than the number of credits specified by the program catalog, may be applied toward both degrees. In addition to the admission requirements of the combined BS/MS pathway, students must meet all the admission requirements of the University Graduate School.

Students enrolled in the pathway may count up to six credit hours of MME graduate courses as credits for both the BS and MS degrees. The combined BS/MS pathway has been designed to be a continuous enrollment pathway. During this combined BS/MS pathway, upon completion of all the requirements of the undergraduate program, students will receive their BS degrees. Students in this pathway have up to three major semesters to complete the master's degree after receipt of the bachelor's degree. Students who fail to meet this three-major-semester post BS requirement or who elect to leave the combined pathway at any time and earn only the BS degree will have the same access requirements to regular graduate programs as any other student, but will not be able to use the six credits in both the bachelor's and master's degrees.

For each of the graduate courses counted as credits for both BS and MS degree, a minimum grade of "B" is required. Students enrolled in the pathway may count up to six credit hours of MME graduate courses toward the elective engineering BS requirements as well as toward the MS degree. Only graduate courses with formal lectures can be counted for both degrees. The students are responsible for confirming the eligibility of each course with the undergraduate advisor.

Students interested in the pathway should consult with the undergraduate advisor on their eligibility to the pathway. The students should also meet the graduate advisor to learn about the graduate program and available courses before completing the application form and submitting it to the undergraduate advisor. Applicants will be notified by the department and the University Graduate School of the decision on their applications.

### **Combined BS in Mechanical Engineering/MS in Biomedical Engineering Pathway**

This five-year pathway seamlessly combines a baccalaureate degree in mechanical engineering with the Master's in biomedical engineering. To be considered for admission to the combined bachelor's/master's degree pathway, students must have completed 75 credits in the bachelor's degree program at FIU, have earned at least a 3.25 GPA on both overall and upper division courses, and meet the admissions criteria for the graduate degree program to which they are applying. Students need only apply once to the combined degree program; the application is submitted to Graduate Admissions typically before the student starts the last 30 credits of the bachelor's degree program. A student admitted to the combined degree pathway will be considered to have undergraduate status until the student applies for graduation from their bachelor's degree program. Upon conferral of the bachelor's degree, the student will be granted graduate status and be eligible for graduate assistantships. Students enrolled in the pathway may count up to 9 hours of graduate level courses (i.e., 5000

level or higher) as credits for both the undergraduate and graduate degree programs. For each of the courses counted as credits for both BS and MS degree, a minimum grade of 'B' is required. Upon completion of the combined BS/MS pathway, students must have accumulated a minimum of 24 hours of credits at the graduate (5000+) level. Students enrolled in the pathway are encouraged to seek employment with a department faculty member to work as student assistants on sponsored research projects.

### **Combined BS in Mechanical Engineering/MS in Engineering Management (BSME/MSEM) Degree Pathway**

Students who pursue a BS degree and have completed 75 credits in the undergraduate program of Mechanical Engineering with an overall GPA of 3.2 or higher may, upon recommendation from three faculty members, apply to the department to enroll in the combined BSME/MSEM pathway. Students must also submit an online application to the University Graduate School for admission to the MSEM program. In addition to the admission requirements of the MSEM program, students must meet all the admission requirements of the University Graduate School.

Students need only apply once to the combined degree pathway; the application is submitted to Graduate Admissions typically before the student starts the last 30 credits of the bachelor's degree program. A student admitted to the combined degree pathway will be considered to have undergraduate status until the student applies for graduation from their bachelor's degree program. Upon conferral of the bachelor's degree, the student will be granted graduate status and be eligible for graduate assistantships.

Students enrolled in the combined degree pathway could count up to three Mechanical Engineering graduate courses for both the BSME electives and the MSEM electives, for a total saving of 9 credit hours. The following is a list of eligible Mechanical Engineering graduate courses:

EGM 5346	Computational Engineering Analysis
EGM 5354	Finite Element Method Applications in ME
EGM 5615	Synthesis of Engineering Mechanics
EML 5103	Intermediate Thermodynamics
EML 5152	Intermediate Heat Transfer
EML 5505	Smart Machine Design and Development
EML 5509	Optimization Algorithms
EML 5530	Intermediate CAD/CAE
EML 5606C	Advanced Refrigeration and AC Systems
EML 5709	Intermediate Fluid Mechanics

The combined BSME/MSEM pathway has been designed to be a continuous enrollment pathway. During this combined BSME/MSEM pathway, upon completion of all the requirements of the BSME program, students will receive their BSME degree. Students may elect to permanently leave the combined pathway and earn only the BSME degree. Students who elect to leave the combined pathway and earn only the BS degree will have

the same access requirements to regular graduate programs as any other student, but will not be able to use the 9 credit hours in both the BSME and MSEM degrees.

For each of the graduate courses counted as credits for both BSME and MSEM degrees, a minimum grade of "B" is required. Only graduate courses with formal lecture can be counted for both degrees. The students are responsible for confirming the eligibility of each course with their undergraduate advisors.

Students interested in the combined pathway should consult with their undergraduate advisor on their eligibility to the pathway. The student should also meet the MSEM Program Director to learn about the graduate program and available tracks/courses before completing the application form and submitting it to their undergraduate advisor. Final decision for admission to the MSEM program will be made by the University Graduate School upon recommendation by the Engineering Management program director. Applicants will be notified by the Engineering Management Program and the University Graduate School of the decision on their applications.

### Minor in Energy Systems

Fully enrolled non-mechanical engineering undergraduate students, who have at least a junior status with a cumulative FIU Grade Point Average of 2.0 or better, may apply to the Department of Mechanical and Materials Engineering to request a minor in Energy Systems. To earn a minor in Energy Systems students must complete the 16 credit hours work listed below with a minimum grade of "C" in each course.

EGN 3311	Statics <sup>1</sup>	3
EGN 3321	Dynamics <sup>1</sup>	3
EGN 3343	Thermodynamics I <sup>1</sup>	3
EML 3126	Transport Phenomena <sup>1</sup>	3
EML 3126L	Transport Phenomena Lab <sup>1</sup>	1
<b>and</b>		
EML 4140	Heat Transfer	3
EML 4930	Special Topics	1

Students must meet the pre-requisite requirements for the above-listed courses.

<sup>1</sup>Students who have taken equivalent course/courses will be exempted from taking these courses. However, they need to select courses from the following list:

EML 3101	Thermodynamics II	3
EML 4706	Design of Thermal and Fluid Systems	3
EML 4601	Principles of Refrigerating and Air Conditioning	3
<b>and</b>		
EML 4601L	Refrigeration and A/C Lab	1
EML 4721	Introduction to Computational Thermo-Fluids	3

### Minor in Aerospace Engineering

Fully enrolled non-Mechanical Engineering undergraduate students, who have at least a junior status with a cumulative FIU Grade Point Average of 2.2 or better, may apply to the Department of Mechanical and Materials Engineering to request a minor in Aerospace Engineering. To earn a minor in Aerospace Engineering students must complete the 17 credit hours work listed below with a minimum grade of "C" in each course.

EAS 4105	Introduction to Flight Mechanics	3
EGM 5615	Synthesis of Engineering Mechanics	3
<b>or</b>		
EAS 4200	Introduction to Design and Analysis of Aerospace Structures	3
EMA 3702L	Mechanics and Materials Science Lab	1
EML 4419	Propulsion Systems	3
EML 4711	Gas Dynamics	3
EML 4930	Special Topics	1
<b>and</b>		
EGM 4350	Finite Elements in Mechanical Engineering	3
<b>or</b>		
EML 4721	Introduction to Computational Thermo-Fluids	3
<b>or</b>		
EAS 4712	Aerodynamic Shape Design	3

Students must meet the pre-requisite requirements for the above-listed courses. Students who have taken any equivalent course(s) to those listed above will be exempted from taking the course(s) again. However, they will need to select courses from the following list to satisfy requirements for the minor:

EMA 5295	Principles of Composite Materials	3
EML 4702	Fluid Dynamics	3
EML 4220	Mechanical Vibrations	3
EML 5125	Classical Dynamics	3
EML 5509	Optimization Algorithms	3

### Minor in Engineering Science

Fully enrolled non-mechanical engineering undergraduate students, who have at least a junior status with a cumulative FIU Grade Point Average of 2.0 or better, may apply to the Department of Mechanical and Materials Engineering to request a minor in Engineering Science. To earn a minor in Engineering Sciences students must complete the 17 credit hours listed below with a minimum grade of "C" in each course.

EGN 3311	Statics <sup>1</sup>	3
EGN 3321	Dynamics <sup>1</sup>	3
EGN 3365	Materials in Engineering	3
EMA 3702	Mechanics and Materials Science <sup>1</sup>	3
<b>and</b>		
EMA 3702L	Mechanics and Materials Science Lab <sup>1</sup>	1
<b>or</b>		
EML 3126	Transport Phenomena <sup>1</sup>	3
EML 3126L	Transport Phenomena Lab <sup>1</sup>	1
EGN 3343	Thermodynamics I <sup>1</sup>	3

<sup>1</sup>Students who have taken equivalent course/courses will be exempt from taking these courses. However, they will need to select courses from the following list to satisfy requirements for the minor:

EML 3222	System Dynamics	3
EML 3500	Mechanical Design I	3
EML 3101	Thermodynamics	3
EML 4140	Heat Transfer	3

### Minor in Mechanical Design

Fully enrolled non-mechanical engineering undergraduate students, who have at least a junior status with a cumulative FIU Grade Point Average of 2.0 or better, may