

**College of Engineering**  
**Department of Engineering Science and Mechanics**  
**Minor in Engineering Science and Mechanics**  
**For Students Graduating in Calendar Year 2020**

To obtain a minor in ESM a student must complete 21 credit hours of ESM courses as indicated below.

1. Complete 21 hours of ESM coursework on an A/F basis. A GPA of 2.0 is required in the courses required for the ESM minor.
2. Complete the following courses:

ESM 2104 or ESM 2114	Statics <i>CO: MATH 2204 or Statics and Structures Co: MATH 2204 or MATH 2204H or MATH 2406H</i>	3 ___
ESM 2204	Mechanics of Deformable Bodies <i>PRE: ESM 2104 or 2114, MATH 2204</i>	3 ___
ESM 2304	Dynamics <i>PRE: ESM 2104 or 2114, MATH 2204 CO: MATH 2214</i>	3 ___
ESM 3054	Mechanical Behavior of Materials <i>PRE: ESM 2204, MSE 2034 OR MSE 2044 OR MSE 3094 OR AOE 3094 OR CEE 3684</i>	3 ___

3. Complete one of the following (Fluid Mechanics requirement):

ESM 3234	Fluid Mechanics I-Control Volumes <i>PRE: ESM 2304 PHYS 2306</i>	3 ___
or		
ESM 3024	Introduction to Fluid Mechanics <i>PRE: ESM 2304, MATH 2204</i>	3 ___
or		
ME 3404 †	Fluid Mechanics <i>PRE: ME 2124, MATH 2214</i>	3 ___
or		
CEE 3304 †	Fluid Mechanics for CEE <i>PRE: ESM 2104</i>	3 ___
or		
AOE 3104 †	Aircraft Performance <i>PRE: AOE 2104 OR AOE 2204, ESM 2104, AOE 2074 CO: ESM 2304</i>	3 ___
and		
AOE 3014 †	Naval Architecture <i>PRE: AOE 3104 OR AOE 3204, ESM 2304</i>	3 ___
or		
AOE 3204 †	Ship Hydrodynamics <i>PRE: ESM 2104, MATH 2204, AOE 2104 OR AOE 2204, AOE 2074 CO: ESM 2304</i>	3 ___
and		
AOE 3014 †	Aero/Hydrodynamics <i>PRE: AOE 3104 OR AOE 3204, ESM 2304</i>	3 ___

4. Complete six hours from the following list. At least 3 hours must be 4xxx or above.

ESM 3034	Fluid Mechanics Laboratory <i>PRE: ESM 2304, ECE 3054 CO: ESM 3234</i>	1 ___
ESM 3064	Mechanical Behavior of Materials Lab <i>PRE: ESM 2204 CO: ESM 3054</i>	1 ___
ESM 3124	Dynamics II-Analytical & 3D Motion <i>PRE: ESM 2304, MATH 2214, MATH 2204</i>	3 ___
ESM 3134	Dynamics III-Vibration and Control <i>PRE: ESM 3124, MATH 4564</i>	3 ___
ESM 3154	Solid Mechanics <i>PRE: ESM 2204, MATH 2214 CO: MATH 4574</i>	3 ___
ESM 3334	Fluid Mechanics II-Differential Analysis <i>PRE: ESM 3434 CO: MATH 4574</i>	3 ___
ESM 3444	Mechanics Laboratory <i>PRE: ESM 3234, ESM 3034, ESM 3054, ESM 3064, ESM 3124, ECE 3054 CO: ESM 3134, ESM 3154, ESM 3334</i>	2 ___
ESM 4014	Applied Fluid Mechanics	3 ___
ESM 4024	Advanced Mechanical Behavior of Materials <i>PRE: ESM/MSE 3054</i>	3 ___
ESM 4044	Mechanics of Composite Materials <i>PRE: ESM 2204</i>	3 ___
ESM 4084/AOE 4084	Engineering Design Optimization <i>PRE: MATH 2204</i>	3 ___
ESM 4105	Engineering Analysis of Physiologic Systems	3 ___
ESM 4106	Engineering Analysis of Physiologic Systems	3 ___
ESM 4114	Nonlinear Dynamics and Chaos <i>PRE: ESM 2304 or PHYS 2504, MATH 2214</i>	3 ___
ESM 4204	Musculoskeletal Biomechanics and Biologic Control	3 ___
ESM 4224	Biodynamics & Control	3 ___
ESM 4234	Mechanics of Biological Materials and Structures	3 ___
ESM 4245	Mechanics of Animal Locomotion <i>PRE: ESM 3054</i>	3 ___
ESM 4246	Mechanics of Animal Locomotion <i>PRE: ESM 3234</i>	3 ___
ESM 4304	Hemodynamics	3 ___
ESM 4614	Probability-Based Modeling, Analysis, and Assessment <i>PRE: ESM 2204</i>	3 ___
ESM 4734/AOE 4024	Introduction to Finite Elements	3 ___
ESM 5405 or 5406	Clinical Internship in Biomedical Engineering	3 ___

5. Students completing the minor must obey all prerequisite rules. Some courses above may have additional prerequisites not required for the minor.

† Students taking a non-ESM course for this minor requirement must take an additional 3 credit hours of ESM coursework from #4.