

## Department of Mechanical Science and Engineering

### **Secondary Field Options in Engineering Mechanics**

The seven secondary field options listed below specify required courses and provide a list of approved courses from which the student may choose two. You may alternatively fashion an individualized secondary field option. To do this you will need to meet either with Dr. Emad Jassim or Stephanie Ott-Monsivais (154 MEB) or email [mechse-ug-advise@illinois.edu](mailto:mechse-ug-advise@illinois.edu) to schedule a meeting to obtain secondary field approval. The only requirements are that the courses be related to mechanics, form a coherent and cohesive group, include at least two engineering courses, and total at least 12 hours of advanced-level\* coursework that are distinct from required courses on the Engineering Mechanics flowsheet. Of the required 12 hours, at least 6 hours must be 400-level coursework with a maximum of 6 hours at the 300-level, unless otherwise approved.

<i>Secondary field</i>	<i>Required courses</i>	<i>Approved courses</i>
<b>Biomechanics</b>	<b>MCB 150</b> —Molecular and cellular basis of life <b>MCB 151</b> —Molecular and cellular laboratory <b>TAM 461</b> —Cellular biomechanics	<b>ECE 473/TAM 413</b> —Fund of engineering acoustics <b>ECE 380/BIOE 380</b> —Biomedical imaging <b>ME 481</b> —Whole-body musculoskeletal biomechanics <b>ME 482</b> —Musculoskeletal tissue mechanics <b>ME 483</b> —Mechanobiology <b>BIOP 401</b> —Introduction to biophysics <b>TAM 499</b> —Senior thesis
<b>Computational Mechanics</b>	<b>CS 357</b> —Numerical methods I <b>ME 471</b> —Finite element analysis	<b>CS 450</b> —Introduction to numerical analysis <b>CS 457</b> —Numerical methods II <b>ME 412**</b> —Numerical thermo-fluid mechanics <b>TAM 499</b> —Senior thesis
<b>Engineering Science and Applied Mathematics</b>	<b>MATH 446</b> —Applied complex variables or <b>MATH 448</b> —Complex variables  <b>MATH 4xx</b> (excluding MATH 415, MATH 441, and MATH 442)	<i>Note: For this secondary field, at least two of the Approved courses must be an Engineering course</i> <b>AE 353</b> —Aerospace control systems <b>AE 402</b> —Orbital mechanics <b>CEE 491</b> —Decision and risk analysis <b>ECE 329</b> —Introduction to electromagnetic fields <b>ECE 330</b> —Power circuits and electro-mechanics <b>ECE 473/TAM 413</b> —Fundamentals of engineering acoustics <b>MATH 423</b> —Differential geometry <b>MATH 447</b> —Real variables <b>MATH 482</b> —Linear programming <b>MATH 484</b> —Nonlinear programming <b>MATH 488</b> —Mathematical methods in engineering <b>MATH 489</b> —Dynamics & differential equations <b>MATH 490</b> —Advanced topics in mathematics <b>PHYS 402</b> —Light <b>STAT 400/MATH 463</b> —Statistics and probability I <b>STAT 410/MATH 464</b> —Statistics and probability II <b>TAM 499</b> —Senior thesis

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<b>Experimental Mechanics</b>	<b>TAM 456</b> —Experimental stress analysis <b>ECE 206</b> —Electric and electronic circuits laboratory	<b>CS 357</b> —Numerical methods <b>ECE 473/TAM 413</b> —Fund of engineering acoustics <b>ME 360**</b> —Signal processing <b>PHYS 402</b> —Light <b>TAM 499</b> —Senior thesis
<b>Fluid Mechanics</b>	<b>TAM 435</b> —Intermediate fluid mechanics <b>ME 410</b> —Intermediate gas dynamics	<b>AE 412</b> —Viscous flow and heat transfer <b>CEE 445</b> —Air quality modeling <b>CEE 451</b> —Environmental fluid mechanics <b>CEE 453</b> —Urban hydrology and hydraulics <b>ECE 473/TAM 413</b> —Fund of engineering acoustics <b>ME 412**</b> —Numerical thermo-fluid mechanics <b>TAM 499</b> —Senior thesis
<b>Mechanics of Materials</b>	<b>TAM 424</b> —Mechanics of structural metals  <b>TAM 427/AE 427</b> —Mechanics of polymers <i>or</i> <b>TAM 428/MSE 456/AE 428</b> —Mechanics of composites	<b>CEE 310</b> —Transportation engineering <b>MSE 401</b> —Thermodynamics of materials <b>MSE 489</b> —Materials selection for sustainability <b>NPRE 431</b> —Materials in nuclear engineering <b>TAM 499</b> —Senior thesis
<b>Solid Mechanics</b>	<b>TAM 424</b> —Mechanics of structural metals <b>TAM 451</b> —Intermediate solid mechanics	<b>CEE 360</b> —Structural engineering <b>CEE 460</b> —Steel structures I <b>CEE 461</b> —Reinforced concrete I <b>CS 357</b> —Numerical methods <b>ECE 473/TAM 413</b> —Fund of engineering acoustics <b>TAM 499</b> —Senior thesis

\*MCB 150/MCB 151 acceptable for Biomechanics Secondary Field

\*ECE 206 acceptable for students with Experimental Mechanics Secondary Field

\*\*Engineering Mechanics students will not necessarily have completed the stated prerequisites for these courses. However, EM students normally have sufficient preparation to enroll, with the instructor's permission. Please obtain a MechSE Petition for Pre/Co-Requisite Override form and submit to 154 MEB before registering for these classes.