

Department of Aerospace Engineering and Mechanics   University of Alabama															
Course Offerings   Course offerings subject to change pending enrollment and instructor availability															
Course Number	Slash / Cross Listed	Description	HRS	2024	2025	2025	2025	2026	2026	2026	2027	2027	2027	2028	2028
				Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer
<b>AEM 121</b>		<b>Intro to Aerospace Engineering</b>	1	X			X			X			X		
<b>AEM 201</b>		<b>Statics</b>	3	X	X	X	X	X	X	X	X	X	X	X	X
<b>AEM 249</b>		<b>Algorithms</b>	3	X	X		X	X		X	X		X	X	
<b>AEM 250</b>		<b>Mechanics of Materials</b>	3	X	X	X	X	X	X	X	X	X	X	X	X
<b>AEM 251</b>		<b>Mechanics of Materials Laboratory</b>	1	X	X	X	X	X	X	X	X	X	X	X	X
<b>AEM 264</b>		<b>Dynamics</b>	3	X	X	X	X	X	X	X	X	X	X	X	X
<b>AEM 311</b>		<b>Fluid Mechanics</b>	3	X	X	X	X	X	X	X	X	X	X	X	X
<b>AEM 313</b>		<b>Aerodynamics</b>	3	X	X		X	X		X	X		X	X	
<b>AEM 341</b>		<b>Aerospace Structures</b>	3	X	X		X	X		X	X		X	X	
<b>AEM 351</b>		<b>Aerospace Structures Laboratory</b>	1	X	X		X	X		X	X		X	X	
<b>AEM 360</b>		<b>Astronautics</b>	3	X		X	X			TBD: future elective					
<b>AEM 368</b>		<b>Flight Mechanics</b>	3		X	X		X	X		X	X		X	X
<b>AEM 395</b>		<b>Professional Development in Aerospace Engineering</b>	3				X			X			X		
<b>AEM 402</b>		<b>Integrated Aerospace Design I</b>	3	X			X			X				TBD	
<b>AEM 404</b>		<b>Integrated Aerospace Design II</b>	3		X			X			X			X	
<b>AEM 408</b>	AEM 508	<b>Propulsion Systems</b>	3	X			X			X			X		
<b>AEM 413</b>	AEM 513	<b>Compressible Flow</b>	3		X	X		X	X		X	X		X	X
AEM 414	AEM 514	Experimental Aerodynamics	3	X						X					
AEM 416	AEM 516	Helicopter Theory	3		X						X				
AEM 420		CFD	3	X			X			X			X		
AEM 425	AEM 525	Spacecraft Dynamics and Control	3		X						X				
AEM 428	AEM 528	Space Propulsion	3					X						X	
AEM 446	AEM 546	Intermediate Solid Mechanics	3		X						X				
AEM 448	AEM 548	Stochastic Mechanics	3	X						X					
<b>AEM 451</b>		<b>Aircraft Structural Design</b>	3		X			X			X			X	
AEM 452	AEM 552	Composite Materials	3	X						X					
AEM 453	AEM 553	Multi-Scale Analysis: Composites	3					X						X	
AEM 455	AEM 555	Non-Destructive Evaluation	3				X						X		
<b>AEM 461</b>		<b>Computational Methods for Aerospace Structures</b>	3		X			X			X			X	
<b>AEM 468</b>		<b>Flight Dynamics &amp; Control</b>	3	X			X			X			X		
AEM 469	AEM 569	Orbital Mechanics	3				X						X		
ME/AEM 470	AEM 570	Mechanical Vibration	3	taught by Mechanical Engineering Department											
AEM 474	AEM 574	Structural Dynamics	3	X						X					
AEM 475	AEM 575	Fund of Aeroelasticity	3		X						X				
AEM 482	AEM 582	Space Systems	3		X						X				
AEM 484	AEM 584	Space Environments	3				X						X		
AEM 488	AEM 588	Advanced Space Propulsion & Power	3		X						X				
AEM 489	AEM 589	Space Law	3		X						X				
AEM 491/492		Special Problems	1-6	scheduled by faculty advisor											
AEM 493		Special Topics	3	scheduled by faculty advisor; P/F option											
<b>AEM 495</b>		<b>Senior Seminar</b>	3	X			X			Planned replacement with AEM 395					
AEM 496/497		Honors Special Topics	3	scheduled by faculty advisor											

**KEY**

<b>Bold</b>	BSAE required
	4XX/5XX course

**Note:**

**Program Change in 2024**

All courses require sufficient enrollment to be offered

**Course Descriptions:**

<https://catalog.ua.edu/undergraduate/engineering/aerospace-mechanics/courses/>

**Program Requirements:**

<https://catalog.ua.edu/undergraduate/engineering/aerospace-mechanics/bs/#text>

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				Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer
AEM 500		Intermediate Fluid Mechanics	3		X			X			X			X	
AEM 508	AEM 408	Propulsion	3	X			X			X			X		
AEM 513	AEM 413	Compressible Flow	3		X	X		X	X		X	X		X	X
AEM 514	AEM 414	Experimental Aerodynamics	3	X						X					
AEM 516	AEM 416	Helicopter Theory	3		X						X				
AEM 518		Uncrewed Aircraft Systems	3	in development											
AEM 520		CFD	3					X							X
AEM 525	AEM 425	Spacecraft Dynamics and Control	3		X						X				
AEM 528	AEM 428	Space Propulsion	3					X						X	
AEM 530		Continuum Mechanics	3				X						X		
AEM 535		Applied FEM	3	X						X					
AEM 546	AEM 446	Intermediate Solid Mechanics	3		X			X			X			X	
AEM 548	AEM 448	Stochastic Mechanics	3	X						X					
AEM 552	AEM 452	Composite Materials	3	X						X					
AEM 553	AEM 453	Multi-Scale Analysis: Composites	3					X						X	
AEM 555	AEM 455	Non-Destructive Evaluation	3				X						X		
AEM/ME 562		Intermediate Dynamics (alt w/ ME)	3	ME			X			ME			X		
AEM 566		Optimal Control and Estimation	3					X						X	
AEM 569	AEM 469	Orbital Mechanics	3				X						X		
ME/AEM 570	ME/AEM 470	Mechanical Vibration	3	taught by Mechanical Engineering Department											
AEM 574	AEM 474	Structural Dynamics	3	X						X					
AEM 575	AEM 475	Fundamentals of Aeroelasticity	3		X						X				
AEM 582	AEM 482	Space Systems	3		X						X				
AEM 584	AEM 484	Space Environments	3				X						X		
AEM 588	AEM 488	Advanced Space Propulsion & Power	3		X						X				
AEM 589	AEM 489	Space Law	3		X						X				
AEM 591/592		Special Problems	1-6	scheduled by faculty advisor											
AEM 593		Special Topics	3	scheduled by faculty advisor; P/F option											
AEM 594		Special Projects	1-6	scheduled by faculty advisor; letter grade option											
AEM 598		Non-Thesis Research	1-3	scheduled by faculty advisor											
AEM 599		Thesis Research	1-12	scheduled by faculty advisor											
AEM 606		Physical Gas Dynamics	3				X						X		
AEM 614		Airfoil & Wing Theory	3					X						X	
AEM 616		Rotorcraft Aeromechanics	3	taught when demand/resources are sufficient											
AEM 621		Viscous Flow	3				X						X		
AEM 622		Turbulent Flow	3		X						X				
AEM 624		Hypersonic Flow	3	X						X					
AEM 625		Advanced CFD	3	taught when demand/resources are sufficient											
AEM 635		Finite Element Methods	3				X						X		
AEM 637		Theory of Elasticity	3					X						X	
AEM 638		Introduction Experimental Mechanics	3								X				
AEM 644		Engineering Fracture Mechanics	3				X								
AEM 648		Theory of Plasticity	3							X					
AEM 649		Fatigue Analysis	3	X											
AEM 655		Advanced Composite Materials	3		X						X				
AEM 662		Multi-Body Dynamics	3	taught when demand/resources are sufficient											
AEM 667		Navigation and Target Tracking	3				X						X		
AEM 668		Advanced Flight Dynamics & Control	3	X							X				
AEM 669		Advanced Astrodynamics	3	taught when demand/resources are sufficient											
AEM 675 (691)		Advanced FEA	3					X						X	
AEM 685		Engineering Optimization	3				X						X		
AEM 691		Special Problems	3	scheduled by faculty advisor											
AEM 693		Special Topics	3	scheduled by faculty advisor; P/F option											
AEM 694		Special Project	1-6	scheduled by faculty advisor; letter grade option											
AEM 698		Non-Dissertation Research	1-3	scheduled by faculty advisor											
AEM 699		Dissertation Research	1-12	scheduled by faculty advisor											
GES 551		Matrix & Vector Analysis	3	X		X	X		X	X		X	X		X
GES 553 (591)		ODE (could be listed as AEM 591)	3	X						X					
GES 554		PDE	3		X	X		X	X		X	X		X	X
GES 555		Nonlinear PDE	3				X						X		

Key

- Mechanics Core Course
- Math Course offered by AEM

Course Descriptions:

<https://catalog.ua.edu/graduate/engineering/aerospace-mechanics/#coursestextcontai>

Program Requirements:

<https://catalog.ua.edu/graduate/engineering/aerospace-mechanics/#programs>

<b>Core</b>	<b>Mechanics (3 hours)</b>
	AEM 500 Intermediate Fluid Mechanics AEM 546 Intermediate Solid Mechanics AEM/ME 562 Intermediate Dynamics
	<b>Math (3 hours)</b>
	GES 551 Matrix and Vector Analysis GES 554 Partial Differential Equations AEM 548 Stochastic Mechanics
	<b>Math (3 hours of an additional approved course)</b>

<b>Courses relevant to Areas of Interest</b>	<b>Aerodynamics/Fluids</b>	<b>Aero-structures/Solids</b>
	AEM 500 Intermediate Fluid Mechanics AEM 508 Propulsion AEM 513 Compressible Flow AEM 514 Experimental Aerodynamics AEM 516 Helicopter Theory AEM 520 CFD AEM 530 Continuum Mechanics AEM 548 Stochastic Mechanics AEM 575 Aeroelasticity AEM 606 Physical Gas Dynamics AEM 614 Airfoil and Wing Theory AEM 616 Rotorcraft Aeromechanics AEM 621 Viscous Flow AEM 622 Turbulent Flow AEM 624 Hypersonic Flow AEM 625 Advanced CFD	AEM 530 Continuum Mechanics AEM 535 Applied FEM AEM 546 Intermediate Solid Mechanics AEM 548 Stochastic Mechanics AEM 552 Composite Materials AEM 553 Multi-scale Analysis: Composites AEM 555 Non-destructive Evaluation AEM 574 Structural Dynamics AEM 575 Aeroelasticity AEM 635 Finite Element Methods AEM 637 Elasticity AEM 638 Introduction to Experimental Mechanics AEM 644 Engineering Fracture Mechanics AEM 648 Theory of Plasticity AEM 649 Fatigue Analysis AEM 655 Advanced Composite Materials AEM 675/691 Advanced FEA AEM 685 Engineering Optimization
	<b>Dynamics/Control/Guidance/Navigation</b>	<b>Space Systems/Propulsion</b>
	AEM 525 Spacecraft Dynamics and Control AEM/ME 562 Intermediate Dynamics AEM 566 Optimal Control and Estimation AEM 569 Orbital Mechanics AEM/ME 570 Mechanical Vibrations AEM 574 Structural Dynamics AEM 575 Aeroelasticity AEM 616 Rotorcraft Aeromechanics AEM 662 Multi-body Dynamics AEM 667 Navigation and Targeting Tracking AEM 668 Advanced Flight Dynamics and Control AEM 669 Advanced Astrodynamics AEM 685 Engineering Optimization	AEM 500 Intermediate Fluid Mechanics AEM 508 Propulsion AEM 525 Spacecraft Dynamics and Control AEM 528 Space Propulsion AEM/ME 562 Intermediate Dynamics AEM 566 Optimal Control and Estimation AEM 569 Orbital Mechanics AEM 582 Space Systems AEM 584 Space Environment AEM 588 Advanced Space Propulsion AEM 589 Space Law AEM 662 Multi-body Dynamics AEM 669 Advanced Astrodynamics AEM 685 Engineering Optimization
<b>Common Math and Elective Courses</b>	<b>Common Math-credit Courses</b>	<b>Common Electives</b>
	GES 500 or ST 560 or MATH 551 or MATH 554: <i>Courses in statistics</i> GES 551 Matrix and Vector Analysis AEM 591/GES 553 Ordinary Differential Equations GES 554 Partial Differential Equations GES 555 Nonlinear PDE AEM 548/GES 548 Stochastic Mechanics ME 501 Mechanical Engineering Analysis ST 531 Data Mining ST 561 Applied Design of Experiments MATH 511 Numerical Analysis I MATH 520 Linear Optimization Theory MATH 572 Linear Algebra MATH 583 Complex Analysis I	ME 509 Intermediate Heat Transfer ME 511 Computational Heat Transfer and Fluid Flow ME 514 Principles of Combustion ME 571 Fundamental of Acoustics ME 577 Advanced Linear Controls
	<i>Some courses may have pre-requisites. Consult with the course home department. Other courses may be suitable for elective credit if relevant to our program. Consult with your research advisor. Most engineering and science related programs at UA do not have a distance program, thus their courses are not available for our distance students.</i>	

<b>Key</b>	
	Mechanics Core Course
	Math Core Course