

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	2022	2023	2023	2023	2024	2024	2024	2025	2025	2025	2026	2026
				Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer
AEM 120		Aerospace Sciences for Educators	4			X			X						X
AEM 121		Intro to Aerospace Engineering	1	X			X			X			X		
AEM 201		Statics	3	X	X	X	X	X	X	X	X	X	X	X	X
AEM 249		Algorithms	2	X	X		X	X		X	X		X	X	
AEM 250		Mechanics of Materials	3	X	X	X	X	X	X	X	X	X	X	X	X
AEM 251		Mechanics of Materials Laboratory	1	X	X	X	X	X	X	X	X	X	X	X	X
AEM 264		Dynamics	3	X	X	X	X	X	X	X	X	X	X	X	X
AEM 311		Fluid Mechanics	3	X	X	X	X	X	X	X	X	X	X	X	X
AEM 313		Aerodynamics	3	X	X		X	X		X	X		X	X	
AEM 341		Aerospace Structures	3	X	X		X	X		X	X		X	X	
AEM 351		Aerospace Structures Laboratory	1	X	X		X	X		X	X		X	X	
AEM 360		Astronautics	3	X		X	X		X	X		X	X		X
AEM 368		Flight Mechanics	3		X	X		X	X		X	X		X	X
AEM 402		Integrated Aerospace Design I	3	X			X			X				X	
AEM 404		Integrated Aerospace Design II	3		X			X			X			X	
AEM 408	AEM 508	Propulsion Systems	3	X			X			X				X	
AEM 413	AEM 513	Compressible Flow	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					
AEM 451		Aircraft Structural Design	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	
AEM 461		Comput. Meth. Aerospace Structures	3		X			X			X			X	
AEM 468		Flight Dynamics & Control	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 481	AEM 581	Complex Engineering Systems	3	taught when demand/resources are sufficient											
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		TBD					
AEM 491/492		Special Problems	1-6	scheduled by faculty											
AEM 495		Senior Seminar	3	X			X			X			X		

KEY

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

Course Descriptions:

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

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				Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer
AEM 500		Intermediate Fluid Mechanics	3		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 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				
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	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				
ME/AEM 577		Advanced Linear Controls	3	taught by Mechanical Engineering Department											
AEM 581	AEM 481	Complex Engineering Systems	3	taught when demand/resources are sufficient											
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 594		Special Project	1-6	scheduled by faculty advisor											
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	X						X					
AEM 635		FEM	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					X						X	
AEM 667		Navigation and Target Tracking	3					X						X	
AEM 668		Advanced Dynamics of Flight	3		X					X					
AEM 669		Advanced Astrodynamics	3					X						X	
AEM 685		Engineering Optimization	3				X						X		
AEM 691		Advanced FEA	3					X						X	
AEM 691		Special Problems	3	scheduled by faculty advisor											
AEM 694		Special Project	1-6	scheduled by faculty advisor											
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	X	X
GES 554		PDE	3		X	X		X	X		X	X		X	X

**Key**

	Mechanics Core Course
	Aerospace Core Course
	Math Course offered by AEM

**Course Descriptions:**

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

Courses relevant to Areas of Interest	<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 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 574 Structural Dynamics AEM 575 Aeroelasticity AEM 555 Non-destructive Evaluation AEM 635 FEM 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 Advance Composite Materials AEM 685 Engineering Optimization AEM 691 Advanced FEA
Common Math and Elective Courses	<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/ME 577 Advanced Linear Controls AEM 616 Rotorcraft Aeromechanics AEM 662 Multi-body Dynamics AEM 667 Navigation and Targeting Tracking AEM 668 Advanced Flight Dynamics AEM 669 Advanced Astrodynamics	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 581 Complex Engineering Systems 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
Common Math and Elective Courses	<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 GES 554 Partial Differential Equations GES 555 Nonlinear PDE 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
<i>Some courses may have pre-requisites. Consult with the course 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>		

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	Mechanics Core Course
	Aerospace Core Course