

Course Schedule - Fall 2006

Aerospace Engineering

100 **Intro to Aerospace Engineering** Credit: 1 hours.

Introduction to the Aerospace Engineering curriculum and career. Typical section topics include aircraft and rocket design and flight. Overviews of the topics are presented along with theory to be experimentally verified.

CRN	Type	Section	Time	Days	Location	Instructor
46515	lecture-discussion	AD	09:00 AM - 09:50 AM	R	room 243 Mechanical Engineering Bldg	Elliott, G
46515: 1 hoursIntro to applied aircraft design.						
46516	lecture-discussion	SD	09:00 AM - 09:50 AM	R	room 106B1 Engineering Hall	Langbort, C
46516: 1 hoursIntro to applied spacecraft design.						

199 **Undergraduate Open Seminar** Credit: 1 to 5 hours.

(A A E 199)

CRN	Type	Section	Time	Days	Location	Instructor
10004	independent study		ARRANGED			
10004: Instructor Approval Required						

311 **Incompressible Flow** Credit: 3 hours.

Equations of motion for incompressible flow, both inviscid and viscous; potential flow theory, inviscid airfoil theory: two- and three-dimensional, Navier-Stokes equations, laminar boundary layer and transition to turbulence. Prerequisite: CS 101; credit or concurrent registration in MATH 241 (formerly MATH 243) or MATH 380.

CRN	Type	Section	Time	Days	Location	Instructor
29785	lecture-discussion	A	10:00 AM - 10:50 AM	MWF	room 1320 Digital Computer Laboratory	Austin, J

321 **Aerospace Structures I** Credit: 3 hours.

Fundamental concepts in the linear theory of elasticity, including stress, strain, equilibrium, compatibility, material constitution and properties. Introduction to failure mechanisms and criteria. Application to plane stress/strain problems, beams in extension and bending, and shafts in torsion. Credit is not given for both AE 321 and TAM 251. Prerequisite: TAM 210 and MATH 385.

CRN	Type	Section	Time	Days	Location	Instructor
29786	lecture-discussion	A	09:00 AM - 09:50 AM	MWF	room 112 Transportation Bldg	Chasiotis, I

352 Aerospace Dynamics Credit: 3 hours.

Particle kinematics and dynamics; Lagrange's equations; vibration of multiple degree-of-freedom systems; rotational kinematics and dynamics of rigid bodies. Credit is not given for both AE 352 and TAM 412. Prerequisite: AE 252, MATH 225 and MATH 385.

CRN	Type	Section	Time	Days	Location	Instructor
29788	lecture-discussion	A	11:00 AM - 11:50 AM	MWF	room 103 Talbot Laboratory	Namachchivaya, N; O'Donnell, K

395 Honors Project Credit: 1 to 4 hours.

Special aerospace engineering project or reading course for James Scholars in engineering. Prerequisite: James Scholar in engineering; consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
10012	independent study		ARRANGED			
10012: Instructor Approval Required						

396 Honors Seminar Credit: 1 to 4 hours.

Special lecture sequences and/or discussion groups arranged each term to bring James Scholars in engineering into direct contact with the various aspects of engineering practices and philosophy. Prerequisite: James Scholar in engineering; consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
10015	independent study		ARRANGED			
10015: Instructor Approval Required						

397 Independent Study Credit: 1 to 3 hours.

Independent theoretical and experimental projects in aerospace engineering. May be repeated. Prerequisite: Consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
10008	independent		ARRANGED			

study						
10008: Instructor Approval Required						

402 *Orbital Mechanics* Credit: 3 or 4 hours.

Analysis of orbits in an inverse-square gravitational field; elementary rocket dynamics, impulsive orbit transfer and rendezvous, and Lambert's Theorem with applications; patched-conic trajectories, planetary gravity-assist maneuvers, and linearized orbit theory with application to simplified analytical models; perturbations. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: AE 302 or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
29794	lecture-discussion	A	11:00 AM - 11:50 AM	MWF	room 241 Everitt Elec and Comp Engr Lab	Conway, B

412 *Viscous Flow and Heat Transfer* Credit: 4 hours.

Momentum and thermal transport in wall boundary-layer and free shear flows, solutions to the Navier-Stokes equations for heat conducting laminar and turbulent shear flows; similarity concepts; thermal boundary layers in ducts and high-speed aerodynamic boundary layers. Same as ME 411, and TAM 438. 4 undergraduate hours. 4 graduate hours. Prerequisite: AE 311 or ME 310 or equivalent.

CRN	Type	Section	Time	Days	Location	Instructor
29800	lecture-discussion	A	10:00 AM - 11:50 AM	TR	room 335 Mechanical Engineering Bldg	Lee, K

416 *Applied Aerodynamics* Credit: 3 or 4 hours.

Two-dimensional and finite wing theory with emphasis on the mechanisms of lift and drag generation; Reynolds number and Mach number effects; drag analysis; high-lift wing systems; propeller and rotor aerodynamics; control surface design; and application of V/STOL aerodynamics. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: AE 311 or equivalent; or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
29803	lecture-discussion	A	12:00 PM - 12:50 PM	MWF	room 101 Transportation Bldg	Selig, M

420 *Intro to Finite Element Anlyis* Credit: 3 or 4 hours.

Same as CSE 451, and ME 471. See ME 471.

CRN	Type	Section	Time	Days	Location	Instructor
36855	lecture	C	10:00 AM - 10:50	MWF	room 243	Thomas, B

			AM		Mechanical Engineering Bldg	
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428 *Mechanics of Composites* Credit: 3 hours.
Same as TAM 428. See TAM 428.

CRN	Type	Section	Time	Days	Location	Instructor
35294	lecture-discussion	F	02:00 PM - 02:50 PM	MWF	room 103 Talbot Laboratory	Sottos, N

433 *Aerospace Propulsion* Credit: 3 hours.

Fundamentals of rocket and airbreathing jet propulsion devices; prediction of thrust, combustion reactions, specific fuel consumption, and operating performance; ramjets; turbojets; turboprops; turbofans; turboprops; aerothermodynamics of inlets, combustors, and nozzles; compressors, turbines; and component matching. 3 undergraduate hours. Prerequisite: AE 312 and CS 101.

CRN	Type	Section	Time	Days	Location	Instructor
29787	lecture-discussion	A	02:00 PM - 02:50 PM	MWF	room 269 Everitt Elec and Comp Engr Lab	Burton, R

440 *Aerospace Systems Design I* Credit: 3 hours.

Introduction to the design of aerospace flight systems. The principles of systems engineering, as they apply to the design process, are presented. A general design methodology is introduced. These concepts are then applied to the initial sizing of both aircraft and spacecraft systems. Involves intensive technical writing. Students must enroll in a two term sequence, AE 440 and AE 441. 3 undergraduate hours. No graduate credit. Prerequisite: Credit or concurrent registration in AE 302, AE 311, AE 322, AE 352, and AE 433.

This course satisfies the General Education Criteria for a Advanced Composition course.

AE 440 and AE 441 are approved for General Education credit only as a sequence. Both courses must be completed to receive Advanced Composition credit.

CRN	Type	Section	Time	Days	Location	Instructor
31206	lecture-discussion	A1	03:00 PM - 04:20 PM	R	room 335 Mechanical Engineering Bldg	Loth, E
31206: Advanced Composition course.						
	lecture-discussion	A1	03:00 PM - 04:20 PM	T	room 103 Talbot Laboratory	Loth, E
: Advanced Composition course.						
: Topic: Aircraft Design.						
31216	lecture-discussion	S1	03:00 PM - 04:20 PM	TR	room 241 Everitt Elec and Comp	Coverstone, V

					Engr Lab	
31216: Advanced Composition course.						
31216: Topic: Spacecraft Design.						

460 Aerodynamics & Propulsion Lab Credit: 2 hours.

Examines theory and application of experimental techniques in aerospace engineering with emphasis on fluid dynamic, aerodynamic, thermal, combustion, and propulsion phenomena. 2 undergraduate hours. No graduate credit. Prerequisite: AE 311; credit or concurrent registration in AE 433.

Students must register for one lab and one lecture-discussion section.

CRN	Type	Section	Time	Days	Location	Instructor
36451	laboratory	AB1	01:00 PM - 03:00 PM	M		Elliott, G
36451: DO NOT GO TO THE LABS THE FIRST WEEK. GO TO CLASS FIRST ON THURSDAY AT 9AM, THEN LAB ASSIGNMENTS WILL BE MADE.						
36452	laboratory	AB2	04:00 PM - 06:00 PM	F		Elliott, G
36452: DO NOT GO TO THE LABS THE FIRST WEEK. GO TO CLASS FIRST ON THURSDAY AT 9AM, THEN LAB ASSIGNMENTS WILL BE MADE.						
36453	laboratory	AB3	11:30 AM - 01:30 PM	R		Elliott, G
36453: DO NOT GO TO THE LABS THE FIRST WEEK. GO TO CLASS FIRST ON THURSDAY AT 9AM, THEN LAB ASSIGNMENTS WILL BE MADE.						
36454	laboratory	AB4	01:00 PM - 02:50 PM	T		Elliott, G
36454: DO NOT GO TO THE LABS THE FIRST WEEK. GO TO CLASS FIRST ON THURSDAY AT 9AM, THEN LAB ASSIGNMENTS WILL BE MADE.						
36455	laboratory	AB5	11:00 AM - 12:50 PM	T		Elliott, G
36455: DO NOT GO TO THE LABS THE FIRST WEEK. GO TO CLASS FIRST ON THURSDAY AT 9AM, THEN LAB ASSIGNMENTS WILL BE MADE.						
36456	laboratory	AB6	02:00 PM - 04:00 PM	R		Elliott, G
36456: DO NOT GO TO THE LABS THE FIRST WEEK. GO TO CLASS FIRST ON THURSDAY AT 9AM, THEN LAB ASSIGNMENTS WILL BE MADE.						
36457	laboratory	AB7	04:00 PM - 06:00 PM	M		Elliott, G
36457: DO NOT GO TO THE LABS THE FIRST WEEK. GO TO CLASS FIRST ON THURSDAY AT 9AM, THEN LAB ASSIGNMENTS WILL BE MADE.						
36458	laboratory	AB8	09:00 AM - 11:00 AM	M		Elliott, G

36458: DO NOT GO TO THE LABS THE FIRST WEEK. GO TO CLASS FIRST ON THURSDAY AT 9AM, THEN LAB ASSIGNMENTS WILL BE MADE.

36450	lecture-discussion	AE1	09:00 AM - 09:50 AM	TR	room 103 Talbot Laboratory	Elliott, G
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36450: Do not go to the labs the first week. Go to class first on Thursday at 9am, then lab assignments will be made.

470 Aerospace Numerical Methods Credit: 3 hours.

Introduction to numerical methods used in aerospace engineering. Finite difference method; Variational principles and Rayleigh-Ritz method; finite element method; applications from simple structural mechanics and aerodynamics problems encountered in aerospace engineering. 3 undergraduate hours. No graduate credit. Prerequisite: CS 101, AE 311, AE 312, AE 321, and AE 322; or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
29791	lecture-discussion	A	09:00 AM - 09:50 AM	MWF	room 106B8 Engineering Hall	Geubelle, P

497 Independent Study Credit: 1 to 4 hours.

Independent theoretical and experimental projects in aerospace engineering. Prerequisite: Senior standing in engineering; consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
10019	independent study		ARRANGED			

10019: Instructor Approval Required

498 Special Topics Credit: 1 to 4 hours.

May be repeated in the same or separate semesters as topics vary to a maximum of 9 undergraduate hours or 12 graduate hours. Prerequisite: Senior standing in engineering; as specified for each topic offering, see Schedule or departmental course information.

CRN	Type	Section	Time	Days	Location	Instructor
39787	laboratory	A	ARRANGED			
	lecture-discussion	A	04:00 PM - 05:50 PM	T	room 225A Talbot Laboratory	Coverstone, V

: Topic: Interdisciplinary Design. 2 or 3 hours.

46729	lecture-discussion	B	10:00 AM - 10:50 AM	MWF	room 225A Talbot Laboratory	Bergman, L
48365	lecture-discussion	MPA	ARRANGED			Bretl, T

45598	lecture-discussion	RLB	ARRANGED			Burton, R
41230	lecture-discussion	RPM	01:00 PM - 01:50 PM	F	room 225A Talbot Laboratory	White, S
	lecture-discussion	RPM	02:00 PM - 02:50 PM	T	room 106B3 Engineering Hall	White, S
: 3 hoursRapid Prototyping and Manufacturing, 3 hours						
39791	lecture-discussion	SSS	04:30 PM - 06:00 PM	TR	room 344 Mechanical Engineering Bldg	Neogi, N
39791: Topic: Software And Systems Safety. This Section is for 3 Hours Only.						

504 **Optimal Aerospace Systems** Credit: 4 hours.

Formulation of parameter and functional optimization problems for dynamic systems; applications of optimization principles to the control and performance of aerospace vehicles, including optimal flight paths, trajectories, and feedback control. Prerequisite: AE 352 or equivalent.

CRN	Type	Section	Time	Days	Location	Instructor
29806	lecture-discussion	A	09:00 AM - 09:50 AM	MWF	room 225A Talbot Laboratory	Prussing, J

528 **Nonlinear Continuous Media** Credit: 4 hours.

Fundamental concepts of large deformations in nonlinear elasticity and inelasticity with applications: generalized tensors, finite deformations, stress-strain relations in terms of strain energy functions, solutions of tension, shear and bending problems, finite plane strain, theory of successive approximations, fiber-reinforced beams, plates and cylinders, thermodynamics of deformable media, stability considerations, and constituent relations for inelasticity. Prerequisite: Consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
39793	lecture-discussion	A	08:30 AM - 09:50 AM	TR	room 225A Talbot Laboratory	Hilton, H

555 **Multivariable Control Design** Credit: 4 hours.

Frequency response design-specifications; algebraic and analytic constraints in scalar systems; uncertainty representation; Nyquist stability theory, small gain condition, multi-input multi-output systems; singular value decomposition; robustness and u-function; linear quadratic regulator based design; recovery of LQ Design properties; Kalman filter; Riccati equations; H-infinity based design; reduction; balanced truncation; Hankel singular values; coprime factor reduction; loop shaping. Same as GE 521. Prerequisite: ECE 515.

CRN	Type	Section	Time	Days	Location	Instructor
36459	lecture-discussion	A	03:00 PM - 04:20 PM	MW	room 241 Everitt Elec and Comp	Sreenivas, R

					Engr Lab	
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556 Robust Control Credit: 4 hours.

Signal and system spaces; stability, robustness, and the small gain theorem; factorization and parameterization of all stabilizing controllers; performance and achievable closed loop maps; model matching; design of optimal single-input single-output systems in H-infinity, H2, L1 senses; extensions to multi-output systems; structured and unstructured uncertainty; robust performance analysis and synthesis; multi-objective control. Prerequisite: ECE 515 and MATH 446.

CRN	Type	Section	Time	Days	Location	Instructor
39797	lecture-discussion	A	01:30 PM - 02:50 PM	TR	room 225A Talbot Laboratory	Voulgaris, P

590 Seminar Credit: 0 hours.

Presentation by graduate students, staff, and guest lecturers of current topics in aerospace engineering. Approved S/U grading only. Prerequisite: Graduate standing in aerospace engineering.

CRN	Type	Section	Time	Days	Location	Instructor
29808	conference	A	04:00 PM - 04:50 PM	MWF	room 103 Talbot Laboratory	Bragg, M

597 Independent Study Credit: 1 to 4 hours.

Independent theoretical and experimental projects in aerospace engineering. Prerequisite: Graduate standing in engineering; consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
10021	independent study		ARRANGED			
10021: Instructor Approval Required						

598 Special Topics Credit: 1 to 4 hours.

Special topics in Aerospace Engineering. May be repeated in the same or separate terms as topics vary to a maximum of 12 hours. Prerequisite: Graduate standing in engineering; as specified for each topic offering, see Schedule or departmental course information.

CRN	Type	Section	Time	Days	Location	Instructor
40012	laboratory	A	ARRANGED			
	lecture-discussion	A	04:00 PM - 05:50 PM	T	room 225A Talbot Laboratory	Coverstone, V

: Instructor Approval Required Topic: Interdisciplinary Design. Meets with AE 498/ECE 498 ID/ID1. Instructor's consent required to register. 2 hours.

39796	lecture-discussion	DP	10:00 AM - 11:50 AM	MW	room 143 Everitt Elec and Comp Engr Lab	Lambros, J
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39796: 4 hours Topic: Dynamic Properties Of Materials. 4 hours.

40633	lecture-discussion	GD	03:00 PM - 03:50 PM	MWF	room 335 Mechanical Engineering Bldg	Stewart, D
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40633: 4 hours Topic: Gas Dynamics 1. Meets with ME 510. 4 hours.

599 Thesis Research Credit: 0 to 16 hours.

Research in the various areas of aerospace engineering. Approved for S/U grading only. May be repeated.

CRN	Type	Section	Time	Days	Location	Instructor
10024	independent study		ARRANGED			
10024: Instructor Approval Required						
48640	independent study	SPV	ARRANGED			Vanka, S