

Course Schedule - Fall 2007

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 241 Everitt Elec and Comp Engr Lab	Elliott, G
46515: 1 hoursTopic: Applied aircraft design.						
46516	lecture-discussion	SD	09:00 AM - 09:50 AM	R	room 106B8 Engineering Hall	Langbort, C
46516: 1 hoursTopic: Applied spacecraft design.						

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

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 165 Everitt Elec and Comp Engr Lab	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. Prerequisite: MATH 385 and TAM 210.

CRN	Type	Section	Time	Days	Location	Instructor
29786	lecture-discussion	A	09:00 AM - 09:50 AM	MWF	room 119 Materials Science and Eng Bld	Geubelle, P

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

395 **Honors Project** credit: 1 to 4 hours.

Special aerospace engineering project or reading course for James Scholars in engineering. Prerequisite: 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: 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 study		ARRANGED			
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.

CRN	Type	Section	Time	Days	Location	Instructor
29794	lecture-discussion	A	11:00 AM - 11:50 AM	MWF	room 165 Everitt Elec and Comp Engr Lab	Prussing, J

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.

CRN	Type	Section	Time	Days	Location	Instructor
29800	lecture-discussion	A	10:00 AM - 11:50 AM	TR	room 218 Mechanical Engineering Bldg	Krier, H

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; application of V/STOL aerodynamics. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: AE 311.

CRN	Type	Section	Time	Days	Location	Instructor
29803	lecture-discussion	A	10:00 AM - 10:50 AM	MWF	room 241 Everitt Elec and Comp Engr Lab	Lee, K

420 **Intro to Finite Element Anlys** 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	09:00 AM - 09:50 AM	MWF	room 243 Mechanical Engineering Bldg	Thomas, B

428 **Mechanics of Composites** credit: 3 hours.
Same as MSE 456 and TAM 428. See TAM 428.

CRN	Type	Section	Time	Days	Location	Instructor
35294	lecture- discussion	F	02:00 PM - 02:50 PM	MWF	room 105 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; turbofans; turboprops; aerothermodynamics of inlets, combustors, and nozzles; compressors, turbines; 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 253 Mechanical Engineering Bldg	Bodony, D

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. AE 440 and AE 441 taken in sequence fulfill the Advanced Composition Requirement. 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	TR	room 135 Mechanical Engineering Bldg	Broeren, A
31206: Advanced Composition course.						
31206: Topic: Aircraft Design.						
31216	lecture- discussion	S1	03:00 PM - 04:20 PM	TR	room 218 Mechanical	Coverstone, V

					Engineering Bldg	
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 - 02:50 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 - 05:50 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 - 01:20 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 - 03:50 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 - 05:50 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 - 10:50 AM	M		Elliott, G

			AM			
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 253 Mechanical Engineering Bldg	Elliott, G
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.

CRN	Type	Section	Time	Days	Location	Instructor
29791	lecture-discussion	A	09:00 AM - 09:50 AM	MWF	room 112 Transportation Bldg	Loth, E

497 **Independent Study** credit: 1 to 4 hours.

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

CRN	Type	Section	Time	Days	Location	Instructor
10019	independent study		ARRANGED			
10019: Instructor Approval Required						
50734	independent study	DJB	ARRANGED			Bodony, D

498 **Special Topics** credit: 1 to 4 hours.

Special topics in Aerospace Engineering. May be repeated in the same or separate terms if topics vary to a maximum of 9 undergraduate hours or 12 graduate hours. Prerequisite: As specified for each topic offering; see Schedule or departmental course information.

CRN	Type	Section	Time	Days	Location	Instructor
46729	lecture-discussion	B	10:00 AM - 10:50 AM	MWF	room 225A Talbot Laboratory	Bergman, L
46729: 3-4 hours Topic: Aerospace Structural Dynamics						

39788	lecture-discussion	D	10:00 AM - 11:20 AM	TR	room ARR Talbot Laboratory	Voulgaris, P; Namachchivaya, N
39788: 3-4 hours Topic: Intro to SYS Dynamics & Controls.						
39787	laboratory	ID	ARRANGED			
	lecture-discussion	ID	04:00 PM - 05:50 PM	T	room 225A Talbot Laboratory	Coverstone, V
: 1-3 hours Topic: Interdisciplinary Design. Meets with AE 598/ECE 498 ID/ID1. Interdisciplinary engineering space design projects that are student lead, designed, donstructed, and tested						
48365	lecture-discussion	MPA	07:30 AM - 08:50 AM	MW	room 106B3 Engineering Hall	Bretl, T
48365: 3-4 hours Topic: Intelligent Mobile Navigation. Implement a navigation aid on a Nokia N95 smartphone, in order to learn the basic principles of motion planning (embedded software development, localization and mapping, search algorithms, and human-machine interaction).						
45598	lecture-discussion	RLB	ARRANGED			Burton, R
45598: 1-4 hours Topic: Space Access Project. Design, build and fly a subscale 28 pound thrust gas turbine-powered 66" long aircraft.						
41230	lecture-discussion	RPM	02:00 PM - 02:50 PM	TR	room ARR Talbot Laboratory	White, S
41230: 3 hours3 hours Topic: Rapid Prototyping and Manufacturing. Survey of rapid prototyping techniques with special emphasis on fused deposition modeling (FDM). Laboratory training in FDM is provided.						
39791	lecture-discussion	SSS	04:30 PM - 05:50 PM	TR	room 241 Everitt Elec and Comp Engr Lab	Neogi, N
39791: 3 hours Topic: Software and Systems Safety. Design a safety-critical software decision aid for an instrumented landing system parallel runway approach for large aircraft.						

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.

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

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, and 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 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 for S/U grading only.

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

597 **Independent Study** credit: 1 to 4 hours.

Independent theoretical and experimental projects in aerospace engineering. Prerequisite: 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: As specified for each topic offering; see Schedule or departmental course information.

CRN	Type	Section	Time	Days	Location	Instructor
45402	lecture-discussion	CM	01:00 PM - 02:50 PM	TR	room 225A Talbot Laboratory	Chasiotis, I
45402: 4 hours Topic: Contact Mechanics and Scanning Probe Microscopy (SPM). Fundamental/theoretical background in connection with practical operations in SPM.						
49969	lecture-discussion	DSC	04:00 PM - 04:50 PM	R	room 336 Mechanical Engineering Bldg	Langbort, C
	lecture-discussion	DSC	04:00 PM - 05:50 PM	T	room 336 Mechanical Engineering Bldg	Langbort, C
: 4 hours Topic: Distributed Decision. Studying recent literature on mathematical theory of multi-agent decision in the presence of limited information.						

42991	lecture-discussion	FM	03:00 PM - 04:20 PM	TR	room 241 Everitt Elec and Comp Engr Lab	Lambros, J
42991: 4 hours Topic: Fracture Mechanics. Advanced level description of concepts in linear and non-linear fracture mechanics, fatigue and failure of aerospace structures and materials, and numerical simulation of fracture/failure phenomena.						
40633	lecture-discussion	GD	03:00 PM - 03:50 PM	MWF	room 153 Mechanical Engineering Bldg	Georgiadis, J
40633: 4 hours Topic: Gas Dynamics 1. Meets with ME 510. 4 hours.						
40012	laboratory	ID	ARRANGED			
	lecture-discussion	ID	04:00 PM - 05:50 PM	T	room 225A Talbot Laboratory	Coverstone, V
: Instructor Approval Required 1-3 hours Topic: Interdisciplinary Design. Meets with AE 498/ECE 498 ID/ID1. Interdisciplinary engineering space design projects that are student lead, designed, constructed, and tested.						
42992	lecture-discussion	NA	08:30 AM - 09:50 AM	TR	room 225A Talbot Laboratory	Hilton, H
42992: 4 hours Topic: Nonlinear Aeroelasticity An integrated approach to inter-active nonlinear aerodynamics and structural dynamical responses.						
50803	lecture-discussion	RLB	ARRANGED			Burton, R
50803: Meets 23-Aug-07 - 07-Dec-07.						

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						