Courses and Registration

Students register for classes through the Registrar’s website during their assigned access periods every semester. The Registration Information Sheet will tell you when you may register.

It is the student’s responsibility to be aware of registration deadlines and requirements and to ensure your registration is confirmed. More information regarding registration deadlines and requirements can be found on the Registrar’s website.

Database of Course Syllabi and Instructor CVs for the past two years from across the university. These are mainly undergraduate syllabi.

Course Loads

Full-time registration for graduate students is 9 hours in fall, 9 hours in spring, 3 hours in summer.

Summer Registration Requirements

- Students must register in the summer to maintain full-time student status if they are receiving Academic Employment, such as a Graduate Research Assistantship (GRA) or Teaching Assistantship (TA). Summer registration for all students may be whole session or either half session. If the student has academic employment (e.g. GRA) and would like to register for a second-session course, the student should still register during the spring registration period. The student should also contact the Graduate Program Coordinator who can contact the appropriate sources in the graduate school so that the student is not penalized or unable to be appointed.
- Students must register in the summer to maintain full-time student status if they are receiving a fellowship. In the ASE/EM graduate programs we offer whole session courses at the graduate level. If you want to register for another session there are undergraduate classes available or you can look in other programs. If the student has a fellowship and would like to register for a second-session course, the student should still register during the spring registration period. The student should also contact the Graduate Program Coordinator who can contact the appropriate sources in the graduate school so that the student is not penalized. A student must be registered for fellowship money to be dispersed; if the student waits until the second session to register, their fellowship will not be dispersed until the second session registration is complete.
- If a student is going on a department-approved internship and they will not have academic employment during the internship, they do not have to register for summer tuition.
  - International students must officially complete the CPT process; instructions are available on the internship link.
  - A student will still be eligible for student health insurance even if they are not enrolled during the summer. International students will be audited at the beginning of June for health insurance. If an international student is no longer eligible for employee insurance, the student health insurance plan will automatically be added to the spring tuition bill.
  - While domestic students are not required to purchase student health insurance, they are allowed to do so. More information about health insurance as a student is available through University Health Services. (Scroll down to "other helpful information.")
- Continuous registration in dissertation hours is not required for summer session, only long semesters.
- If a student registers for more than full time total hours, they are responsible for additional tuition costs.

Continuous Registration

If the student has been admitted to candidacy for a doctoral degree, registration in the dissertation course, ASE or EM *99W, must be registered for continuously during the spring and fall semesters until the degree is completed. A minimum of 3 dissertation credits are required each long semester (fall and spring). The student may register for courses in addition to dissertation credits or research.

Employment Waivers - Non Texas Residents

GRAs and TAs should request an employment tuition waiver every semester they are appointed as a GRA/TA. This will waive the out-of-state portion of their tuition bill for that semester, based on their employment status.

International Health Insurance Waivers

The UT Board of Regents requires that international students on F-1 and J-1 visas be covered by health insurance; therefore, international students receive automatic charges for health insurance on their tuition and fee bills. Students may request an insurance waiver if they are covered by an alternative insurance policy that meets the basic requirements of the UT Health Insurance Plan.

Students with GRA or TA assignments of 20 hours receive employee health insurance, which meets these basic requirements, and can apply for a waiver of the international health insurance fees.

Confirming Attendance

Once students have registered and completed their waivers, everyone must view their tuition bill.

Registration is not complete until this bill is paid and students click the [CONFIRM ATTENDANCE] button in the tuition bill screen (you might want to take a screenshot for your records).

If students do not confirm attendance by the registration deadline, their registration will be cancelled and they will have to pay late registration fees to re-register. Attendance is confirmed when “your registration is complete” appears in the tuition bill screen.

Visit the Changing registration page for information on when and how you can change registration during the semester.

Common Questions

Q. Why is my tuition bill still so high?
Aerospace Engineering Core Courses

ASE 380P. Mathematical Analysis for Aerospace Engineers.

Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing and consent of instructor.

**Topic 1: Analytical Methods I.** Introduction to modern mathematics, real analysis of functions of one variable, linear algebra, elements of real analysis of functions of many variables, calculus of variations. Aerospace Engineering 380P (Topic 1) and Engineering Mechanics 386K may not both be counted.

**Topic 2: Analytical Methods II.** Elements of complex analysis, Fourier and Laplace transforms, ordinary and partial differential equations, perturbation methods. Only one of the following may be counted: Aerospace Engineering 380P (Topic 2), Computational Science, Engineering, and Mathematics 386L, Engineering Mechanics 386L.

ASE 381P. System Theory.

Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing and consent of instructor.

**Topic 1: Linear Systems Analysis.** Linear dynamical systems; controllability and observability; stability; realization theory; state-feedback and observers. Additional prerequisite: Aerospace Engineering 381P (Topic 6).

**Topic 2: Multivariable Control Systems.** Multivariable feedback systems; factorizations and controller parameterization; limitations and trade-offs of feedback; robust stability and performance; robust H2 and H-infinity control methods. Additional prerequisite: Aerospace Engineering 381P (Topic 1) or the equivalent.

**Topic 3: Optimal Control Theory.** Unconstrained and constrained finite-dimensional optimization, introduction to calculus of variations and optimal control, necessary and sufficient conditions for optimality, Pontryagin's Maximum Principle, minimum-time control, linear quadratic optimal control theory, introduction to dynamic programming, Hamilton-Jacobi-Bellman equation.


**Topic 11: Nonlinear Dynamics and Control.** Analysis and synthesis of nonlinear control systems. Stability theory, Center manifold analysis, feedback linearization, backstepping, time-scale separations, nonlinear observers, Aeromechanical system applications. Aerospace Engineering 381P (Topic 11) and 396 (Topic: Nonlinear Dynamics and Control) may not both be counted. Additional prerequisite: Aerospace Engineering 381P (Topic 1) or the equivalent, and consent of instructor.

**Topic 13: Decision and Control of Human-Centered Robots.** Oriented towards graduate students in control and robotics who are interested in end-to-end performance of real-world human-centered robotic systems. Control theory for robotics; socio cognitive modeling of human activity; behavior intervention via optimal control; Kinodynamic motion planning; temporal logics and their application to human-centered robots; whole-Body Dynamic Locomotion Controllers; intelligent Collision Management for human-centered robots. Explores theory and application from state-of-the-art papers from venues such as IEEE CSS American Control Conference, Robotics Science and Systems, The International Workshop on the Algorithmic Foundation of Robotics, Dynamic Walking, and IEEE-RAS International Conference on Humanoid Robots. Aerospace Engineering 381P (Topic 13) and Mechanical Engineering 396D may not both be counted. Additional prerequisite: Consent of graduate adviser.

**Topic 14: System ID and Adaptive Control.** System identification, persistence of excitation, model reference adaptive control, projection operators, immersion and invariance techniques, applications to aeromechanical systems. Aerospace Engineering 381P (Topic 14) and 396 (Topic: System ID and Adaptive Control) may not both be counted. Additional prerequisite: Aerospace Engineering 381P (Topic 1) or the equivalent.

ASE 382Q. Fluid Mechanics.

Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing and consent of instructor.
Topic 1: Foundations of Fluid Mechanics. Fundamental equations; constitutive equations for Newtonian fluids; inviscid, incompressible potential flow; viscous flow including exact solutions and boundary layer theory; compressible flow.


Topic 10: Plasmas and Reactive Flows. Fundamental description of plasmas and reactive flows. Includes derivation of common governing transport equations for a broad class of electrically conducting and nonconducting reactive gases, and electromagnetic field interactions with gases, gas-phase and surface kinetics, transport properties, and applications.


ASE 382R. Aerodynamics.

Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing and consent of instructor.

Topic 3: Hypersonic Aerodynamics. Characteristics and assumptions of hypersonic flow; hypersonic similitude; Newtonian theory; constant density solutions.

Topic 5: Advanced Computational Methods. Development and implementation of numerical methods for solution of transport equations; computational grid generation; applications to fluid flows, including shock waves.

Topic 6: Molecular Gas Dynamics. Same as Mechanical Engineering 381Q (Topic 4). Kinetic theory, chemical thermodynamics, statistical mechanics. Applications: equilibrium gas properties, chemical kinetics, interaction of matter with radiation, rarefied gas dynamics. Additional prerequisite: Consent of instructor


ASE 384P. Structural and Solid Mechanics.

Three lecture hours or two lecture hours and three laboratory hours a week for one semester, depending on the topic. May be repeated for credit when the topics vary. Prerequisite: Graduate standing and consent of instructor.


Topic 2: Solid Mechanics II. Same as Engineering Mechanics 388L. Continuation of Engineering Mechanics 388. Additional topics in elasticity, plasticity, viscoelasticity, variational methods, and other areas of solid mechanics. Three lecture hours a week for one semester. Prerequisite: Graduate standing, Engineering Mechanics 388 or Aerospace Engineering 384P (Topic 1), and consent of instructor.


Topic 4: Finite Element Methods. Same as Computational Science, Engineering, and Mathematics 393F and Engineering Mechanics 394F. Derivation and implementation of the finite element method; basic coding techniques; application to problems of stress and diffusion. Three lecture hours a week for one semester. Only one of the following may be counted: Aerospace Engineering 384P (Topic 4), Computational Science, Engineering, and Mathematics 393F, Engineering Mechanics 394F. Additional prerequisite: Graduate standing and consent of instructor.

Topic 6: Advanced Structural Dynamics. Analysis of complex flexible systems; discretization of complex structures by the finite element method; advanced computational methods for large finite element models. Three lecture hours a week for one semester. Additional prerequisite: Aerospace Engineering 384P (Topic 3) or Engineering Mechanics 384L or the equivalent.

Topic 8: Selected Topics in Aeroelasticity. Classical and contemporary topics in aeroelasticity; general introduction to aeroelastic phenomena, including flutter, divergence, control reversal, and flexibility effects on stability and control; aeroelastic tailoring; active control concepts; unsteady aerodynamic theories for lifting surfaces and bodies; aeroelastic system identification, including nonlinear systems (theory and laboratory applications). Three lecture hours a week for one semester.

Topic 11: Mechanics of Composite Materials. Constitutive equations; micromechanical and macromechanical behavior of lamina; strength and stiffness in tension and compression, theory of laminated plates; strength of laminates; delamination. Three lecture hours a week for one semester.


Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing and consent of instructor.

Topic 2: Mission Analysis and Design. Mission design and mission constraints, launch windows; rendezvous analysis; orbital design interactions with thermal and structural analysis; design of a typical mission.

Topic 6: Optimal Spacecraft Trajectories. Optimal control of spacecraft; primer vector theory; impulsive maneuvers; finite burn high/low thrust maneuvers; solar sail; numerical methods; applications to contemporary trajectory problems using single or multiple spacecraft.

Topic 7: Sensors and Actuators. Students use LabVIEW to study aerospace devices such as inertial navigation systems, control-moment gyroscopes, optical navigation systems, torque coils and magnetometers, robots, and integrated satellites.

ASE 388P. Celestial Mechanics.

Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing and consent of instructor.
Topic 2: Celestial Mechanics I. N-body problem; three-body problem; restricted three-body problem; Jacobian integral; zero-velocity curves; equilibrium points; stability; linearized solutions; variational equations; periodic orbits; the two-body problem; variation of parameters; Lagrange's planetary equations; applications to near-earth and deep-space trajectories; numerical methods.

Topic 3: Celestial Mechanics II. Hamiltonian mechanics; dynamical systems; canonical transformations; invariant manifolds; Poincare surfaces of section; applications to restricted n-body problems; applications to sun-earth-moon or sun-planet-moon particle trajectory problems. Additional prerequisite: Aerospace Engineering 388P (Topic 2).

ASE 389P. Satellite Applications.

Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing and consent of instructor.

Topic 1: Determination of Time. Concepts of time; fundamental reference system; polar motion; practical methods in time determination and dissemination: historical and present-day time scales; atomic clocks; time transfer via satellite.

Topic 2: Satellite Geodesy. Explore theory of the gravitational potential, including its time-variations; spherical harmonics and other representations; space-based remote sensing of the geopotential and its gradients; mass flux variability and its applications.

Topic 4: Methods in Orbit Determination. Variational methods of the orbit determination, Orbit parameter estimation, satellite tracking techniques and observables, modern precision orbit determination. Three lecture hours a week for one semester. Aerospace engineering 389P (Topic 4) and 396 (Topic: Orbit Determination) may not both be counted. Additional prerequisite: Aerospace Engineering 381P (Topic 6) or equivalent.

Topic 7: Global Navigation Satellite System Signal Processing. Comprehensive review of the theory and applications of the Global Positioning System (GPS), including the space segment, the control segment, the user segment, dilution of precision, GPS time, antispooing, selected availability, differential kinematic/dynamic techniques, field procedures, and GPS data collection and analysis. Applications of ground-based, aircraft-based, and satellite-based GPS receivers.

Topic 8: Satellite Control Systems. Spacecraft equations of motion; linearization and stability, classical control methods; digital and sampled data systems; multivariable control; attitude determination and control; momentum management; coupled modes; and case studies in satellite control.

Topic 9: Synthetic Aperture Radar: Principles and Applications. Synthetic Aperture Radar (SAR) imaging for Earth remote sensing, including image formation concepts and interpretation, radar interferometry processing and strategies, surface deformation, topographic mapping, and polarimetric applications.

Topic 10: Fundamentals and Geophysical Application of Imaging Radar Systems. Exploration of how radar images are formed and manipulated, as well as applications of the systems to problems such as measurement of the Earth crustal deformation. Focus on radar as a signal processing problem, radar image formation, polarimetric radars, and radar interferometry. Subjects include system design, scattering from natural surfaces, range and azimuth processing algorithms, and processor design. Additional prerequisite: Knowledge of Fourier Transform and at least one programming language (MATLAB, C or Fortran).
