

Course Selection

To facilitate course selection, the table below organizes the graduate courses in AE and other departments in a set of topical tracks. These lists are provided as guides when selecting courses in your area of interest. Actual courses selection should be done in consultation with your advisor.

Topical tracks in suggested aerospace engineering and associated courses

1. Aerodynamics
 - a. AE 511: Transonic aerodynamics
 - b. AE 514: Boundary layer theory
 - c. AE 515: Wing theory
 - d. AE 598 AAA: Advanced applied aerodynamics
 - e. AE 598 GSE: Diagnostics for aerodynamics and propulsion
 - f. TAM 537: Experimental fluid mechanics
2. Fundamental fluid mechanics
 - a. AE 510: Advanced gas dynamics
 - b. AE 513: Dispersed multiphase flow
 - c. AE 514: Boundary layer theory
 - d. TAM 531: Inviscid flow
 - e. TAM 532: Viscous flow
 - f. TAM 536: Instability and transition
 - g. TAM 537: Experimental fluid mechanics
 - h. TAM 538: Turbulence
3. Computational fluid mechanics
 - a. AE 510: Advanced gas dynamics
 - b. AE 598 CFD: Advanced computational aerodynamics
 - c. AE 598 CMF: Multiphase Computational Fluid Dynamics
 - d. TAM 570: Computational fluid mechanics
4. Combustion & Propulsion
 - a. AE 435: Electric propulsion
 - b. AE 538: Combustion fundamentals
 - c. AE 598 GSE: Diagnostics for aerodynamics and propulsion
5. Astrodynamics
 - a) AE 402: Orbital Mechanics
 - b) AE 502: Adv. Orbital Mechanics
 - c) AE 504: Optimal Aerospace Systems
 - d) AE 508: Optimal Spacecraft Trajectories
 - e) AE 403: Spacecraft Attitude Control
 - f) AE 454: Intro. To Dynamics & Control
 - g) AE 554: Dynamical Systems Theory
 - h) AE 434: Rocket Propulsion

- i) MATH 484: Nonlinear Programming
 - j) GE 531: Genetic Algorithm Methods
 - k) ENG 451: Cubesat
6. Dynamical Systems & Control
- a) AE 454: Intro. To Dynamics & Control
 - b) AE 504: Optimal Aerospace Systems
 - c) AE 554: Dynamical Systems Theory
 - d) AE 455: Estimation & Data Assimilation
 - e) AE 552: Random Dynamical Systems (no longer in course catalog)
 - f) AE 555: Multivariable Control Design
 - g) AE 556: Robust Control
 - h) ECE 534: Random Processes
 - i) PHYS 510: Nonlinear Dynamics
 - j) PHYS 511: Adv. Nonlinear Dynamics
 - k) PHYS 500: Advanced Mechanics
 - l) MATH 561: Theory of Probability I
 - m) MATH 562: Theory of Probability II
 - n) MATH 518: Differentiable Manifolds I
 - o) MATH 519: Differentiable Manifolds II
 - p) MATH 587/ECE 580: Optimization by Vector Space Methods
7. Information & Intelligent Systems
- a) AE 483: Aerospace Computing Systems
 - b) CS 473: Algorithms
 - c) AE 482: Intro. to Robotics
 - d) AE 598: Distributed Systems & Control
 - e) IE 598: Convex Optimization
 - f) AE 504: Optimal Aerospace Systems
 - g) AE 554: Dynamical Systems Theory
 - h) ECE 534: Random Processes (?)
 - i) MATH 482: Linear Programming
 - j) MATH 484: Nonlinear Programming
 - k) MATH 518: Differentiable Manifolds I
 - l) MATH 519: Differentiable Manifolds II
 - m) CS 446: Machine Learning
 - n) AE 555: Multivariable Control Design
 - o) AE 556: Robust Control
 - p) ECE549/CS543: Computer Vision
8. Aerospace Materials
- a) TAM 451: Intermediate Solid Mechanics or TAM 551: Solid Mechanics I
 - b) AE 420: Finite Element Analysis
 - c) AE/TAM 427: Mechanics of Polymers
 - d) AE/TAM 428: Mechanics of Composites

- e) AE 522: Dynamic Response of Materials
 - f) AE 523: Nanoscale Contact Mechanics
 - g) AE 525: Advanced Composite Materials
 - h) AE 526: Composite Manufacturing
 - i) AE 529: Viscoelasticity Theory
 - j) AE 598/TAM 555: Fracture Mechanics
 - k) AE 560: Fracture Mechanics Laboratory
 - l) ME 551: Polymer Rheology & Processing
 - m) TAM 424: Mechanics of Structural Metals
 - n) TAM 456: Experimental Stress Analysis
 - o) TAM 524: Micromechanics of Materials
 - p) TAM 554: Plasticity
 - q) CEE 576: Nonlinear finite elements
 - r) CEE 598 TCI: Computational inelasticity
9. Aerospace Structures
- a) TAM 451: Intermediate Solid Mechanics or TAM 551: Solid Mechanics I
 - b) AE 420: Finite Element Analysis
 - c) AE 451: Aeroelasticity
 - d) AE 598NA: Nonlinear Aeroelasticity
 - e) AE 528: Large Deformation Theory
 - f) TAM 518: Wave Motion
 - g) CEE 571: Plates and Shells
 - h) CEE 573: Structural Dynamics II
 - i) CEE 598 FEC: Nonlinear continuum finite element method
 - j) CEE 598 NFM: Nonlinear finite element method