AERE Technical Electives List

Students with a catalog year of 2021-22 or newer are required to take 9 Technical Elective credit hours from the following three groups/categories (3 credit hours of A-Tech Electives, 3 credit hours of B-Tech Elective, 3 credit hours of C-Tech Electives)

Students with a catalog year prior to 2021-22 must take 12 Technical Elective credit hours from the following three groups/categories (3 credit hours of A-Tech Electives, 3 credit hours of B-Tech Electives, 6 credit hours of C-Tech Electives)

Group A.) Aerospace – 3 credit hours needed

(Please Note: not all Group A Technical Electives are offered every semester)

- any AERE or EM graduate level (5000+ level) courses
- AERE 4070 Applied Formal Methods
- AERE 4120 Propulsion
- AERE 4130X Hypersonic Aerothermodynamics
- AERE 4150 Rocket Propulsion*
- AERE 4170 Experimental Mechanics
- AERE 4220 Vibrations and Aeroelasticity
- AERE 4230 Composite Flight Structures
- AERE 4260 Design of Aerospace Structures
- AERE 4290X Penetrating Radiation Methods in Nondestructive Evaluation
- AERE 4320 Flight Control Systems II
- AERE 4330 Spacecraft Dynamics/Control*
- AERE 4420 V/STOL Aerodynamics and Performance
- AERE 4450 Experimental Flow Mechanics & Heat Transfer
- AERE 4460 Computational Fluid Dynamics
- AERE 4480 Fluid Dynamics of Turbomachinery
- AERE 4510 Orbital Mechanics
- AERE 4520 Intro to Systems Engineering & Analysis
- AERE 4630 Intro to Multidisciplinary Design Optimization
- AERE 4640 Spacecraft Systems
- AERE 4680 Large Scale Complex Engineering Systems
- AERE 4730X Random Variables
- AERE 4800 Ultrasonic Nondestructive Evaluation
- AERE 4820X Introduction to Metrology and Testing
- AERE 4830 Aeroacoustics
- Any 4000-level and above course that is cross-listed with AERE

***Please Note:** For students on the 2021-22 catalog or newer, only one of AERE 4150/AERE 4330 can be applied as Technical Elective credit, the other must be taken as a core course requirement for graduation.

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Group B.) Technical/Engineering – 3 credits needed

- any additional course from Group A listed above
- AERE 3810 Intro to Wind Energy
- AERE 4900 Aerospace Engineering Independent Study/Research**
- AERE 4940 Make To Innovate (M2I)**
- ASTRO 3420 Intro to Solar System Astronomy
- ASTRO 3440L Astronomy Laboratory
- ASTRO 3460 Intro to Astrophysics
- Any 3000-level or above COMS courses
  (excluding COMS 3980, COMS 4020, COMS 4140, & COMS 4900)
- EE 3140 Electromagnetics for Non-Electrical Engineers
- EM/MATE 3620 Principles of Nondestructive Testing
- IE 3050 Engineering Economic Analysis
- INDD 3400 Digital Design Technologies (CAD) (previously numbered IND D 341)
- MATH/STAT 3410 Intro to Theory of Probability & Statistics I
- MATH 3650 Complex Variables with Applications
- MATH 3850 Intro to Partial Differential Equations
- MATH 4140 Analysis I
- MATH/COMS 4810 Numerical Methods for Differential Equations
- PHYS 3060 Physics of Wave Motion
- PHYS 3210 Intro to Modern Physics I
- PHYS 3610 Classical Mechanics
- STAT 3050 Engineering Statistics
- any 3000-level or above course in the College of Engineering (must first be approved by AERE Advisor and AERE Curriculum Committee – EE 3510, MAT E 3110, ENGR 3500, & AERE/ME 3180X will not count as a Tech Elective)

****Please Note:** a maximum of six credit hours combined of 4900 Independent Study credit (from any department) & AERE 4940 credit (Make To Innovate) can be applied towards Technical Electives

Group C.) Career – 6 credits needed (prior to 2021-22 catalog), 3 credits needed (2021-22 catalog or newer)

- any additional course from Group A or Group B listed above
- AFAS 3410 Air Force Leadership Studies I
- AFAS 3420 Air Force Leadership Studies II
- FSHN/ME 3730 Science & Practice of Brewing
- NS 3200 Naval Ship Systems I (Engineering)
- NS 3300 Naval Ship Systems II (Weapons)
- any course 3000-level or above from the Iowa State University catalog that is relevant to a student's statement of career goals and objectives. Students will need to type up a document that includes their statement of career goals, how the course ties into those goals, and how it will help the student achieve those goals. That document will need to be submitted to the student's assigned Academic Advisor and the AERE Curriculum Committee for review.