Technical and Limited Elective Course Selections

Technical Electives (9 credits)

Students must select 9 credits as follows:

Aerospace Technical Electives -- 6 credits -- must be 400-level AERSP courses.

- 400-level Aerospace courses not used to meet other program requirements.
- AERSP 204/404 may be used for a maximum of 3 cr. of Aerospace Technical Electives, see section on "CREDITS EARNED AND AWARDED FOR PARTICIPATION IN AERSP 204H/404H PROGRAM."
- AERSP 494 and 496 involve research or projects agreed upon by both the student and faculty before registering for these credits. A maximum of 3 credits in any combination of AERSP 494 and 496 can be earned for one subject. Students who do additional independent study or research in a different subject can earn an additional maximum of 3 cr. in any combination of AERSP 494 and 496. A Department Registration Form should be completed at the beginning of each semester in which AERSP 494 or 496 credits are scheduled in consultation with the faculty advisor. See Appendix A for these forms.

General Technical Elective -- 3 credits – In general, these may be 400-level technical courses chosen from the following programs:

ACS, AE, AERSP, A B E, ASTRO, BIOE, CH E, CE, CMPSC, CSE, EE, EMCH, ESC, FSC, IE, IST, MATH, M E, METAL, METEO, NUCE, PHYS. Also permitted in this category, Co-op/Internship credit[1]. Note that learning assistant credit, or non-technical offerings from these programs would not count in this category.

A list of common General Technical Elective courses taken by Aerospace students is provided below for reference, along with their pre-requisites.

Course Number	Course Title	Prerequisites
ASTRO 291	Astronomical Methods and the Solar System	PHYS 211
ASTRO 292	Astronomy of the Distant Universe	ASTRO 291
PHYS 230	Introduction to Relativity	PHYS 212 and MATH 141, concurrent MATH 220 and Math 230 (or 231)
PHYS 237	Intro to Modern Physics	PHYS 212 or concurrent PHYS 214
EDSGN 468	Engineering Design and Analysis with CAD	EMCH 210 or 211

[1] The first three credits of co-op/internship courses earned apply toward the limited elective. An additional three credits will apply toward the general technical elective.

AE 469	Photovoltaic Systems Design and Construction	E E 210 or E E 211 (or 212)
ASTRO 410	Computational Astrophysics	CMPSC 201 (or 121), PHYS 212, PHYS 213 and PHYS 214
EMCH 400	Advanced Strength of Materials and Design	EMCH 213, EMCH 210
EMCH 407	Computer Methods in Engineering Design	CMPSC 200 (or 201), EMCH 210 (or 213)
EMCH 461/ ME 461	Finite Elements in Engineering	EMCH 213 (or 210), CMPSC 201 (or 200)
EMCH 471	Engineering Composite Materials	(EMCH 213 or EMCH 210) and (CMPSC 200 or CMPSC 201)
EMCH 473/ AERSP 473	Composites Processing	EMCH 471 (or possibly AERSP 470 by prereq override)
ESC 456/EE 456/EGEE 456	Introduction to Neural Networks	(CMPSC 201 or CMPSC 121 or CMPSC 131) and MATH 220
ESC 481	Elements of Nano/Micro-electromechanical Systems Processing and Design	EMCH 213 , or EMCH 315 , or E SC 312
IE 405	Deterministic Models in Operations Research	MATH 220
NUCE 406/ME 406	Introduction to Statistical Thermodynamics	ME 300 (or 201 or 302), MATH 230 (or 231)
METEO 466	Planetary Atmospheres	MATH 141, PHYS 211
EGEE /ME 430	Introduction to Combustion	ME 201 or ME 300
MATH 401	Introduction to Analysis	MATH 230
MATH 405	Advanced Calculus for Engineers and Scientists	MATH 230 and (250 or 251)
MATH 410	Complex Analysis for Mathematics and Engineering	MATH 230
MATH 411	Ordinary Differential Equations	MATH 230 and (250 or 251)
MATH 412	Fourier Series and Partial Differential Equations	MATH 230 and (250 or 251)
MATH 414	Introduction to Probability Theory	MATH 230
MATH 417	Qualitative Theory of Differential Equations	MATH 220 and (250 or 251)

MATH 418	Introduction to Probability and Stochastic Processes for Engineering	MATH 230
MATH 422	Wavelets and Fourier Analysis	
MATH 425	Introduction to Operations Research	MATH 141 and 220
MATH 427	Foundations of Geometry	MATH 230
MATH 430	Linear Algebra and Discrete Models	MATH 220
MATH 441	Matrix Algebra	MATH 220
MATH 449	Applied Ordinary Differential Equations	MATH 250 or 251
MATH 451	Numerical Computations	3 cr. programming, MATH 230
MATH 452	Deep Learning Algorithms and Analysis	MATH 220, 230, CMPSC 121 or 131 or 200 or 201
MATH 455	Introduction to Numerical Analysis	CMPSC 121 or 131 or 200 or 201, MATH 220, 230
MATH 484	Linear Programs and Related Problems	MATH 220, 230
MATH 486	Mathematical Theory of Games	MATH 220
ME 410	Heat Transfer	ME 320 (or request subst. of AERSP 311 & 312), CMPSC 200 or 201, MATH 220
ME 421	Viscous Flow Analysis and Computation	(ME 201 or ME 320 or AERSP 308 or AERSP 311) and (CMPSC 200 or 201) and MATH 220 and (MATH 250 or 251)
ME 455	Automatic Control Systems	Request subst. of AERSP 304 for ME 357, and AERSP 311 & 312 for ME 320
PHYS 419/ MATH 419	Theoretical Mechanics	MATH 230, (250 or 251), PHYS 212, 213, 214
PHYS 462	Applications of Physics in Medicine	PHYS 211

Limited Elective (3 credits)

The Limited Elective can be 3 credits of almost any subject, with some exceptions[2].

Students may select 3 credits from any of the following categories:

- Courses in the Aerospace Technical Elective or General Technical Elective categories
- Courses needed to fulfill requirements for a minor
- Foreign-language courses (at any level)
- Courses in the Engineering Entrepreneurship Program
- Courses in the Engineering Leadership Development Program
- Upon completion of the ROTC program, ROTC students may use 3 cr. of ROTC for GHW and 3 cr. of ROTC as the Limited Elective.
- Co-op/internship students may use 3 cr. of Co-op/Internship courses for the Limited Elective, and 3 cr. of Co-op/Internship as the General Technical Elective.

Some Limited Elective courses (which would **NOT** count as a Technical Elective) to consider include:

Course number	Course Title	Prerequisites
ENGR 405	Project Management for Professionals	
ENGR 407	Technology-Based Entrepreneurship	ECON 102 (or 104)
ENGR 408	Leadership Principles	
ENGR 409	Leadership in Organizations	
ENGR 410	Coaching Skills and Practice for Engineering Leaders	ENGR 408
ENGR 411	Entrepreneurship Business Basics	3 credits in economics
ENGR 415	Technology Launch for Entrepreneurs	ENGR 407 and MGMT 215 or ENGR 310
ENGR 422	Leadership of International Virtual Engineering Teams	ENGR 408
ENGR 425	New Venture Creation	ECON 102 (or 104), CAS 100
ENGR 426	Invention Commercialization	ECON 102 (or 104), CAS 100

[2] Students **MAY NOT** use the following for the Limited Elective:
MATH 001, 002, 003, 004, 005, 006, 007, 021, 022, 026, 030, 036, 040, 041, 100, 198; CHEM 101, 108; PHYS 100, 150, 151, 191, 215, 250, 251, 265; PH SC 007, 008; ENGL 004, 005; KINES (any course); LL ED 005, 010; ESL 004; CAS 126; Technology Courses (those that have a T suffix in the course title)

METEO 469	From Meteorology to Mitigation: Understanding Global Warming	MATH 140
EGEE 405	Renewable Energy in Electricity Markets	EE 210 and ECON 102 (or 104)
ENVSE 400	Safety Engineering	CHEM 110, PHYS 211, MATH 141
ENVSE 420	Fire Safety Engineering	CHEM 110, PHYS 212, MATH 141
ENVSE 440	Industrial Ventilation for Contaminant Control	MATH 141, PHYS 212, CHEM 110
ENVSE 450	Environmental Health and Safety	CHEM 110
ENVSE 470	Engineering Risk Analysis	MATH 251
ENVE 430	Sustainable Engineering	Permission of program
ENVE 460	Environmental Law	Senior standing, Permission of program