REQUIREMENTS FOR THE BACHELOR OF SCIENCE IN AEROSPACE ENGINEERING/MASTER OF SCIENCE

THE UNIVERSITY OF OKLAHOMA

GENERAL REQUIREMENTS

Total Credit Hours ........................................... 152-158*

Minimum Retention/Graduation Grade Point Averages:
Overall - Combined and OU .................................. 3.25
Major - Combined and OU .................................... 3.25
Curriculum - Combined and OU ............................... 3.25

A minimum grade of C is required for each course in the curriculum.

OU encourages students to complete at least 31-32 hours of applicable coursework each year to have the opportunity to graduate in five years.

YEAR..............................................................................................FIRST SEMESTER..............................................................................................SECOND SEMESTER..............................................................................................

FRESHMANS

ENGL 1113, Prin. of English Composition (Core I) .................................. 3
*CHEM 1315, General Chemistry (Core II) ............................................. 5
MATH 1914, Differential and Integral Calculus I (Core I) ......................... 4
HIST 1483, U.S. 1492-1865, or 1493, U.S. 1865-Present (Core IV) .......... 3
ENGR 1411, Freshman Engineering Experience ................................... 1

TOTAL CREDIT HOURS ........................................................................... 16
TOTAL CREDIT HOURS ........................................................................... 17

‡ In order to progress into 2nd year courses in AME, students must successfully complete (grade C or better) MATH 1914; MATH 2924; PHYS 2514 and CHEM 1315 with 3.0 Combined Retention GPA, and possess a minimum 3.0 Combined Retention GPA in 24 or more credit hours.

SOPHOMORES

‡MATH 2934, Differential and Integral Calculus III .................................. 4
PHYS 2524, General Physics for Engr. & Science Majors ....................... 4
AME 2113, Statics .................................................................................. 3
AME 2213, Thermodynamics ................................................................ 3
†AME 2223, Intro. to Aerospace Engineering ....................................... 3

TOTAL CREDIT HOURS ........................................................................... 17
TOTAL CREDIT HOURS ........................................................................... 16

JUNIORS

AME 3112, Solid Mechanics Lab ........................................................... 2
AME 3143, Solid Mechanics .................................................................. 3
AME 3253, Aerodynamics ..................................................................... 3
AME 3272, Wind Tunnel Lab ................................................................. 2
AME 4463, Control Systems .................................................................. 3
ENGR 2002, Professional Development .................................................. 2

TOTAL CREDIT HOURS ........................................................................... 15
TOTAL CREDIT HOURS ........................................................................... 17

‡ Approval for admission to the accelerated BS/MS program must be initiated at the beginning of the second semester of the junior year.

SENIORS

AME 4243, Aerospace Propulsion Systems ............................................. 3
AME 4273, Aerospace Systems Design I ................................................. 3
AME 5493, Space Sciences and Astrodynamics ....................................... 3
AME 4513, Flight Controls ..................................................................... 3
AME Graduate Elective ......................................................................... 3

TOTAL CREDIT HOURS ........................................................................... 15
TOTAL CREDIT HOURS ........................................................................... 17

FIFTH YEAR

AME 5573, Adv. Engineering Analysis I, or MATH Elective ..................... 3
$AME 5980, Thesis Research or Graduate-level Elective ...................... 2-3
AME Graduate Elective ......................................................................... 3
AME Graduate Elective ......................................................................... 3

TOTAL CREDIT HOURS ........................................................................... 11-12
TOTAL CREDIT HOURS ........................................................................... 12-13

STEM Courses designated as Core I, II, III, IV or Capstone are part of the General Education curriculum. Students must complete a minimum of 40 hours of General Education courses, chosen from the approved list.

‡CHEM 1315 can be substituted with CHEM 1335 (Fall only).

† To be chosen from the University-Wide General Education Approved Course List. Three of these 12 hours must be upper-division (3000-4000). See list online.

§ Dependent upon whether a student chooses the thesis or non-thesis option. Non-thesis option additionally requires: AME 5990 Special Project (3 hrs.) to be taken in the Summer between the Senior and the Fifth Year, and Comprehensive Exam to be taken in the last semester of study.

Courses must successfully complete prerequisite courses (with a minimum C grade) before proceeding to the next course.

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Fourth and fifth year graduate electives must satisfy MS in aerospace engineering requirements.

$AME courses are sequential and usually offered only in the semester shown. Note prerequisites on the back of this page.

‡MATH 1823, 2423, 2433, and 2453 sequence can be substituted for MATH 1914, 2924, and 2934.

§AP credit is acceptable for any of these required courses.

GALLOGLY COLLEGE OF ENGINEERING

The Oklahoma State System for Higher Education
Summer 2018 through Spring 2019

*Aerospace Engineering A010 Bachelor of Science in Aerospace Engineering/ Master of Science (Aerospace Engineering) F010
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COURSES IN AEROSPACE AND MECHANICAL ENGINEERING (AME)

2113 Statics. Prerequisite: Physics 2514; MATH 1823 or 1914; MATH 2423 or 2924; and CHEM 1311 all with a minimum grade of C or better with an overall average of 3.0 in these four courses. (AP credit accepted and weighted based upon score.) Mathematics 2433 or 2934 or concurrent enrollment in Mathematics 2433 or 2934. Vector representation of forces and moments; general three-dimensional theorems of statics; centroids and moments of area and inertia. Free body diagrams, equilibrium of a particle and of rigid bodies, distributed loads, friction and internal shear and moment loads. Analysis of trusses, frames, and machines. (F)

2213 Thermodynamics. Prerequisite: Physics 2514; MATH 1823 or 1914; MATH 2423 or 2924; and CHEM 1315 all with a minimum grade of C or better with an overall average of 3.0 in these four courses. (AP credit accepted and weighted based upon score.) Introduction to the foundational dynamics of aerospace vehicles, propulsion system performance, and basic aerodynamic forces and conventions. (F)

2303 Materials, Design and Manufacturing Processes (Crosslisted with Industrial Engineering 2303). Prerequisite: 2113 or Civil Engineering 2113 or Engineering 2113. Mechanical and physical properties of engineering materials. Introduction to design concepts, manufacturing processes and equipment used in engineering. (Sp)

2533 Dynamics. Prerequisite: 2113, Mathematics 2433 or 2934. Dynamics (kinematics and kinetics) of particles and rigid bodies for rectilinear, curvilinear and angular motion; motion and energy methods; conservation of impulse and momentum; introduction to mechanical vibrations. (Sp)

2623 Circuits and Sensors. Prerequisite: Physics 2514; MATH 1823 or 1914; MATH 2423 or 2924; and CHEM 1315 all with a minimum grade of C or better with an overall average of 3.0 in these four courses. (AP credit accepted and weighted based upon score.) Introduction to the foundational dynamics of aerospace vehicles, propulsion system performance, and basic aerodynamic forces and conventions. (F)

2703 Interactive Engineering Design Simulation. Prerequisite: AME 3143, Solid Mechanics; and AME 3513, Fluid Mechanics or AME 3253, Aerodynamics. Visualization and interactive finite element modeling techniques for product design and development. Three-dimensional CAD modeling, components and assemblies, graphic standards, dimensions and tolerances, engineering drawings. Introduction to the use of finite element methods for structural and fluid mechanics problems, with verification. (Sp)

3112 Solid Mechanics Lab. Prerequisite: 2113 or Engineering 2113; 3143 or concurrent enrollment. Measurement of displacement; velocity, acceleration, force, torque, strain, stress, data acquisition, equipment, data and error analysis, the determination of beams, the calculation of stresses, strain energies, and deformation of beams. (F)

3143 Solid Mechanics. Prerequisite: AME 2113 or ENGR 2113; MATH 3113, or MATH 3413 and MATH 3401; AME 2303; AME 2533. Concepts of stress and strain; mechanical behavior of engineering materials; analysis of uniform stress states; analysis of members in torsion; stresses and deflections in beams; modes and theories of failure; design criteria. (F)

3253 Aerodynamics. Prerequisite: AME 2213, AME 2223, AME 2533, MATH 3413 and MATH 3401. Fluid properties, fluid statics, flow description, conservation equation; incompressible inviscid flow dynamics; characteristic airflow parameters; two-dimensional flow around thin wings; airflow around wings of finite span; boundary layer development; compressibility of overexpanded flows for inviscid flows; applications of supersonic shock relations; Prandtl-Meyer expansion waves; quasi-one dimensional flow through nozzles and diffusers. (F)

3272 Wind Tunnel Laboratory. Prerequisite: AME 3253 or concurrent enrollment. Operation and calibration of a subsonic wind tunnel. Calibration of a subsonic wind tunnel. Experimental testing of airfoils, model airplanes, propulsion system, a structural system, or a control system. (F)

3423 Introduction to AeroSpace Engineering. Prerequisite: PHYS 2514; MATH 1823 or 1914; MATH 2423 or 2924; and CHEM 1315 all with a minimum grade of C or better with an overall average of 3.0 in these four courses. (AP credit accepted and weighted based upon score.) Introduction to the foundational dynamics of aerospace vehicles, propulsion system performance, and basic aerodynamic forces and conventions. (F)

3498 Research for Master's Thesis. Variable enrollment, two to nine hours; maximum credit applicable toward degree, six hours. (F, Sp, Su)

COURSES IN ANTHROPOLOGY (ANTH)

4623 Approaches to Cross-Cultural Human Problems. Prerequisite: 1113 or junior standing. Introduction to the foundational dynamics of aerospace vehicles, propulsion system performance, and basic aerodynamic forces and conventions. (F)

COURSES IN CHEMISTRY AND BIOCHEMISTRY (CHEM)

1315 General Chemistry. Prerequisite: Mathematics 1303 or 1643, or math ACT equal to or greater than 23. General Chemistry is an overview of the chemical basis of natural phenomena. First of a two-semester sequence in general chemistry. Topics covered: basic measurement, atomic theory, electron configuration, periodicity, chemical reactivity and energetics, stoichiometry, gas laws and changes in state, molecular structure and molecular structure. A student may not receive credit for this course and CHEM 1335. Laboratory. (F, Sp, Su) (IB)

COURSES IN COMMUNICATION (COMM)

3513 Intercultural Communication. Prerequisite: 1113 and junior standing. Introduction to the foundational dynamics of aerospace vehicles, propulsion system performance, and basic aerodynamic forces and conventions. (F)

COURSES IN COMPUTER SCIENCE (CS)

1313 Programming for Non-Majors with C. Prerequisite: MATH 1523 or concurrent enrollment. Introduction to the foundational dynamics of aerospace vehicles, propulsion system performance, and basic aerodynamic forces and conventions. (F, Sp)

COURSES IN ENGINEERING (ENGR)

1411 Freshman Engineering Experience. Prerequisite: declared major in Engineering or permission of instructor. Required of all entering freshmen with a declared Engineering major. Lecture hours cover a variety of topics including: majors and minors; career planning; advising; and extra-curricular activities. Students also work on multi-disciplinary engineering projects in smaller groups during the lab hour. (F)

2003 Professional Development. Prerequisite: ENGR 1410 or ENGR 1411, or ENGR 3511 or ENGR 3410 or concurrent enrollment; ENGL 1213 or EXPO 1213, and sophomore standing. Develop an understanding of engineering ethics, teamwork, leadership, and professional responsibility through the concepts of contemporary, social, and global issues. (F, Sp)

COURSES IN MATHEMATICS (MATH)

1914 Differential and Integral Calculus I. Prerequisite: satisfactory score on the placement test or, for incoming freshmen, an ACT score of 28 or higher and a high school GPA of 3.75 or higher. Duplicate credits for three hours of 1423 and one hour of 2423. Limits and continuity, differentiation, applications of differentiation to optimization and curve sketching, integration, the fundamental theorem of calculus, the substitution rule, applications of integration to computation of areas. (F)

2934 Differential and Integral Calculus II. Prerequisite: 2443 or 2934 or concurrent enrollment. Complex variable calculus and applications of partial differentiation, multiple integration, line and surface integrals, Green’s-Stokes-Gauss theorems. (F)


G3413 Physical Mathematics I. Prerequisite: 2443 or 2934 or concurrent enrollment. Complex numbers and functions. Fourier series, solution methods for ordinary differential equations and partial differential equations, Laplace transforms, series solutions, Legendre’s equation. Duplicate three hours of 2113. (F)

COURSES IN PHYSICS (PHYS)

2514 General Physics for Engineering and Science Majors. Prerequisite: Mathematics 1823 or Mathematics 1914 with grade of C or better. Not open to students with credit in 1205. Vectors, kinematics and dynamics of particles, work and energy systems of particles, rotational kinematics and dynamics, oscillations, gravitation, fluid mechanics, waves. (F, Sp, Su) [R, NL]

2524 General Physics for Engineering Science Majors. Prerequisite: 2514 and Mathematics 2423 or 2924 with a grade of C or better. Not open to students with credit in 1215. Temperature, heat, thermodynamics, electricity, magnetism, optics. (F, Sp, Su)