

COLLEGE OF ENGINEERING
DEPARTMENT OF AEROSPACE AND OCEAN ENGINEERING
BACHELOR OF SCIENCE IN AEROSPACE AND OCEAN ENGINEERING, MAJOR: AEROSPACE ENGINEERING
FOR STUDENTS GRADUATING IN CALENDAR YEAR 2018
132 CREDITS REQUIRED FOR GRADUATION

FRESHMAN FALL SEMESTER 2014		Credits	FRESHMAN SPRING SEMESTER 2015		Credits
CHEM 1035 General Chemistry (C-)		3	ENGL 1106 First-Year Writing		3
CHEM 1045 General Chemistry Lab Co: CHEM 1035		1	Pre: ENGL 1105		
ENGL 1105 First-Year Writing		3	MATH 1226 Calculus of a Single Variable		4
			Pre: MATH 1225		
MATH 1225 Calculus of a Single Variable (C-)		4	PHYS 2305 Found of Physics I w/lab (C-)		4
Pre: Math Ready			Pre: MATH 1225; Co: MATH 1226		
ENGE 1215 Foundations of Engineering (C-)		2	ENGE 1216 Foundations of Engineering (C-)		2
Co: MATH 1225			Pre: ENGE 1215		
CLE (Area 2, 3, or 7)		3	CLE (Area 2, 3, or 7)		3
TOTAL		16	TOTAL		16
SOPHOMORE FALL SEMESTER 2015		Credits	SOPHOMORE SPRING SEMESTER 2016		Credits
ESM 2104 Statics		3	ESM 2204 Mechanics of Deformable Bodies		3
Co: MATH 2204 or 2204H or 2224 or 2224H			Pre: ESM 2104, (MATH 2204 or 2204H or 2224 or 2224H)		
MATH 2114 Introduction to Linear Algebra		3	ESM 2304 Dynamics, Co: MATH 2214;		3
Pre: MATH 1226 or a grade of at least B in VT MATH 1225			Pre: ESM 2104, (MATH 2204 or 2204H or 2224 or 2224H)		
MATH 2204 Multivariable Calculus		3	MATH 2214 Differential Equations		3
Pre: MATH 1226			Pre: MATH 1226, MATH 2114		
PHYS 2306 Foundations of Physics I w/lab		4	AOE 3094 (MSE 3094) Materials for Aero & Ocean Eng	3 ^[S,SI]	
Pre: MATH 1226, PHYS 2305			Pre: CHEM 1035; Co: ESM 2204, PHYS 2305		
AOE 2074 Computational Methods		2 ^[F,SI]	AOE 3104 Aircraft Performance	3 ^[S,SI]	
Pre: ENGE 1216 or 1114 or 1434			Pre: 2104, ESM 2104; Co: 2074, ESM 2304		
AOE 2104 Intro to AE		2 ^[F,SI]	CLE (Area 3, ECON 2005)		3
Pre: (ENGE 1216 or 1114), PHYS 2305, Co: 2074					
CLE (Area 6)		1			
TOTAL		18	TOTAL		18
JUNIOR FALL SEMESTER 2016		Credits	JUNIOR SPRING SEMESTER 2017		Credits
MATH 4564 Operational Methods		3	MATH Elective		3
Pre: MATH 2214 or 2214H or 2406H or CMDA 2006H			Choice of: MATH 4574, MATH 4404, or STAT 4705		
ME 3134 Fundamentals of Thermodynamics		3	AOE 3054 AOE Experimental Methods		3
Pre: MATH 2214			Pre: 3014, 3024, and 3034		
AOE 3014 Aero/Hydrodynamics		3	AOE 3114 Compressible Aerodynamics		3
Pre: 3104 or 3204, ESM 2304			Pre: 3014, ME 3134		
AOE 3024 Thin-Walled Structures		3	AOE 3124 Aerospace Structures		3
Pre: ESM 2104, ESM 2204			Pre: 3024		
AOE 3034 Vehicle Vibration & Control		3	Choose one:		3
Pre: ESM 2304, MATH 2214			AOE 3134 Stability and Control, Pre: 3034		
			AOE 4140 Spacecraft Dyn & Controls, Pre: 3034, 4134		
AOE 4134 Astromechanics, Pre: ESM 2304		3	Technical Elective		3
TOTAL		18	TOTAL		18
SENIOR FALL SEMESTER 2017		Credits	SENIOR SPRING SEMESTER 2018		Credits
AOE 3044 Boundary Layer Theory		3	AOE 4066 Aircraft Design, Pre:		3
Pre: 3014, MATH 4564, ME 3134			3054, 3114, 3124, 3134, 4065; or		
AOE 4065 Aircraft Design Pre: 3054,3114, 3124, 3134, or		3	AOE 4166 Spacecraft Design		
AOE 4165 Spacecraft Design Pre: 3054,3114, 3124, 4140			Pre: 3054, 3114, 3124, 4140, 4165		
AOE 4154 Aero Engr Lab Pre: 3054, 3114, 3124, (3134 or 4140)		1	Technical Elective		3
AOE 4234 (ME 4234) Aerospace Propulsion Systems		3	CLE (Area 2, 3, or 7)		3
Pre: 3114, ME 3134					
Technical Elective		3	Elective		3
CLE (Area 2, 3, or 7)		3			
TOTAL		16	TOTAL		12

Superscripted annotation [F,S,SI,SII] in Credits column indicates that a course is known to be offered in terms other than when shown. Course offerings are subject to change and the availability of sufficient resources. Students should confirm course offerings in advance with their department. Core courses common to all AOE majors are listed in black. Major courses are listed in blue. AE primary majors with an OE secondary major may substitute 2104 for 2204, and 4065-4066 or 4165-4166 for 4265-4266 in their secondary OE major.

Curriculum for Liberal Education (CLE)

Consult the CLE Alphabetical Listing at: <http://www.cle.prov.vt.edu/guides/alpha.html>, CLE courses need to be completed prior to graduation. If a CLE course is double-counted to satisfy two different CLE areas, a free elective(s) must be taken to maintain a minimum of 133 credits.

CLE Area 1: Writing and Discourse (6 hrs)	ENGL 1105	(3)	ENGL 1106	(3)
CLE Area 2: Ideas, Cultural Traditions, Values Electives (6 hrs)		(3)		(3)
CLE Area 3: Society & Human Behavior electives (6 hrs)	ECON 2005	(3)		(3)
CLE Area 4: Scientific Reasoning and Discovery (8 hrs)	CHEM 1035/1045	(4)	PHYS 2305	(4)
CLE Area 5: Quantitative and Symbolic Reasoning (8 hrs)	MATH 1225	(4)	MATH 1226	(4)
CLE Area 6: Creativity & Aesthetic Experience elective (1 hr)				(1)
CLE Area 7: Global Issues Elective (3 hrs)				(3)

Technical Electives: The AOE department requires 9 credits of technical electives, of which 6 credits must be AOE 3000-level or higher courses. The remaining 3 may be selected from the attached approved list of computer programming courses and other 3000-level or higher technical courses.

Change of Major Requirements: Please see <http://www.enge.vt.edu/undergraduate-changing-majors.html>

Foreign Language Requirements: Students must have had 2 years of a foreign language in high school or one year at the college level (6 credit hours) of the same language. College-level credits used to meet this requirement do not count towards the degree.

Satisfactory Progress Towards Degree: University Policy 91 outlines university-wide minimum criteria to determine if students are making satisfactory progress towards the completion of their degrees. The AOE Department fully supports this policy. Specific expectations for satisfactory progress for AE majors are as follows:

- Each student must meet the minimum University-wide criteria as described in Policy 91 and summarized in the Undergraduate Catalog (under Academic Policies)
- After attempting 68 credit hours, students must have passed AOE 2074 and 3104
- Students must maintain overall 2.0 and in-major GPA (in-major GPA consists of all courses with the AOE designation).

Prerequisites: Prerequisites for each course are listed after the course title. There are no hidden pre-requisites in this program of study. Prerequisites may change from what is indicated. Be sure to consult the University Catalog or check with your advisor for most current requirements.

Graduation Requirements: Students must pass all required courses and both the in-major and overall GPA must be at least 2.0 or graduation. Only free electives and courses only offered on a Pass/Fail basis may be taken Pass/Fail

APPROVED
COMMISSION ON UNDERGRADUATE
STUDIES AND POLICIES

AOE DEPARTMENT ELECTIVE REQUIREMENTS
For students graduating in calendar year 2018

AOE students have several types of electives required in their program of study. Listed below are departmental, College and University requirements governing those electives.

CURRICULUM FOR LIBERAL EDUCATION (CLE): Satisfaction of CLE requirements is required of all students in the university. Engineering students satisfy this requirement in Areas 1, 4, and 5 through curricular math, science and English courses. Areas 2, 3, 6, and 7 are satisfied through elective courses; 6 credits are required in Areas 2 and 3, 1 credit in Area 6 and 3 credits in Area 7. The one course required for Area 7 may, if carefully selected, simultaneously satisfy an Area 2 or 3 requirements. Several courses appear on both the Area 2 and Area 6 lists but can be used to satisfy only one of these requirements. Area 7 is the only area in which a course may “double count.” **All CLE requirements must be met with courses taken on an A/F basis unless a course is only offered on the P/F basis.** A link to the *University Curriculum for Liberal Education Guide* is maintained at <http://www.provost.vt.edu/>. Each year, courses may be added to or removed from each Area. A course may be used to satisfy an Area, if it appears on the list of approved courses for that Area during the year it was taken.

ECON 2005 (Principles of Economics) is required for graduation and may be taken as one of the two Area 3 requirements in the CLE. If a student chooses to satisfy the Area 3 requirements with courses not including ECON 2005, ISE 2014 (Engineering Economy) may also be used to satisfy this requirement but this requires additional credits.

MATH ELECTIVE: All AE students must take Math 4574 (Vector and Complex Analysis for Engineers), Math/AOE 4404 (Applied Numerical Methods) or Statistics 4705 (Probability and Statistics for Engineers) on an A/F basis. (Statistics 4705 is required for OE majors.)

TECHNICAL ELECTIVES: The AOE Department requires 9 credits of technical electives, all of which must be taken on an A/F basis. This includes 6 credits of AOE courses at the 3000 level or above and 3 credits from the list below. Students pursuing both AE and OE majors may fill all technical elective requirements with required courses from their second major. Courses other than those below may be acceptable as technical electives; however, substitutions must be approved by the student’s course advisor *before the course is taken*. Students are responsible for the satisfaction of prerequisites required for their chosen technical electives.

- AOE: Any 3000 or higher level course not required in the student’s major
- CEE: 4384, 4674
- CHEM: 4615
- CS: 1044, 1054, 1064, 1114, 1124
- ECE: 3054, 4164, 4405, 4406, 4624, 4634, 4644
- ENGE: 2514
- ENGR: 3124
- ESM: 3054, 4024, 4044, 4114, 4154, 4614
- GEOG: 4354
- GEOS: 3034, 3114
- ISE: 4404
- MSE: 4055, 4056
- MATH: 3214, 4144, 4225, 4226, 4234, 4245, 4246, 4425, 4426, 4445, 4446, 4574 (if not used as math elective)
- ME: 4204, 4224, 4504, 4524, 4534, 4634, 4644, 4724
- NSEG: 3145, 3146
- PHYS: 3405, 3406, 3655, 3656, 4455, 4456, 4504, 4554, 4614
- STAT: 4105, 4106, 4705 (AE only, if not used as the math elective), 4706

FREE ELECTIVES may be any course you care to take (with the exception of the non-degree credit courses in the attached list) including PE, ROTC, Band, etc. If you have transfer credits or AP credit that did not satisfy one of your curriculum requirements, these may be used as free elective credits. Free electives may be taken on P/F basis provided the student meets the requirements for taking courses P/F and the course is offered on that basis.