

COLLEGE OF ENGINEERING
DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING
BACHELOR OF SCIENCE IN MATERIALS SCIENCE AND ENGINEERING, NUCLEAR MATERIALS OPTION
FOR STUDENTS GRADUATING IN CALENDAR YEAR 2020
126 CREDITS REQUIRED FOR GRADUATION

FALL SEMESTER FRESHMAN 2016		Credits	SPRING SEMESTER FRESHMAN 2017		Credits
CHEM 1035 General Chemistry		3	ENGL 1106 First-Year Writing Pre: ENGL 1105		3
CHEM 1045 General Chemistry Lab Co: CHEM 1035		1	MATH 1226 Calculus of a Single Variable Pre: MATH 1225 (C-)		4
ENGL 1105 First-Year Writing		3	PHYS 2305 Found of Physics I w/lab Pre: MATH 1225; Co: MATH 1226		4
MATH 1225 Calculus of a Single Variable (C-) Pre: Math Ready		4	ENGE 1216 Foundations of Engineering (C-) Pre: ENGE 1215		2
CLE (Area 2, 3 or 7)		3	MATH 1114 Elementary Linear Algebra		2
ENGE 1215 Foundations of Engineering (C-)		2			
TOTAL		16	TOTAL		15
FALL SEMESTER SOPHOMORE 2017		Credits	SPRING SEMESTER SOPHOMORE 2018		Credits
MATH 2204 Intro Multivariable Calculus Pre: MATH 1226		3	CHEM 1036 General Chemistry II Pre: CHEM 1035		3
PHYS 2306 Foundations of Physics I w/lab Pre: MATH 1226, PHYS 2305		4	MATH 2214 Differential Equations Pre: MATH 1114 or MATH 2114		3
ESM 2104 Statics Co: MATH 2204		3	ESM 2204 Mech of Deformable Bodies Pre: ESM 2104, MATH 2204		3
ISE 2214 Manufacturing Processes Lab Pre: ENGE 1216		1	MSE 2054 Fund of Materials Science Pre: 2044 (C)		3 ^[S]
MSE 2044 Fund of Materials Eng (C) Pre: CHEM 1035, Co: PHYS 2305		4 ^[F,S]	MSE 2114 Math Methods in MSE I Pre: 2044 (C)		1 ^[S]
MSE 2884 Materials Eng Prof Dev		1 ^[F]	MSE 3314 Materials Lab I Pre: 2044 (C)		1 ^[S]
			CLE (Area 6)		1
TOTAL		16	TOTAL		15
FALL SEMESTER JUNIOR 2018		Credits	SPRING SEMESTER JUNIOR 2019		Credits
CLE (Area 3) ECON 2005 Principles of Economics		3	MSE 3044 Transport Phenomena MSE Pre: 2044 (C), MATH 2214		3 ^[S]
MSE 3114 Math Methods in MSE II Pre: 2114		1 ^[F]	MSE 3054 Mech Beh of Materials Pre: 2044 or 3094 or 2034 or AOE 3094 or CEE3684; ESM 2204		3 ^[F,S]
MSE 3134 Crystallography and Crystal Structures Pre: 2044(C)		3 ^[F]	MSE 3064 Mech Beh Lab Co: 3054		1 ^[F,S]
MSE 4034 Thermo of Materials Pre: 2044 (C); Co:CHEM 1036		3 ^[F]	MSE 3884 Materials Eng Prof Dev II Pre: junior standing, 2884		1 ^[S]
MSE 4424 Materials Lab II Pre: 2044 (C)		1 ^[F]	MSE 4644 Mat Optimization Des Exp Pre: 3314 or 4424		3 ^[S]
Physical Materials Course		3	Physical Materials Course		3
Physical Materials Course		3	MSE 4164 Principles of Materials Corrosion Co:4034		3 ^[S]
TOTAL		17	TOTAL		17
FALL SEMESTER SENIOR 2019		Credits	SPRING SEMESTER SENIOR 2020		Credits
MSE 4055 Mat Select & Design Pre: 3044, 3054, 2 of (3204, 4414, 4554)		3 ^[F]	MSE 4076 Senior Project Lab II Pre: 4075 Co: 4086,		2 ^[S]
MSE 4075 Senior Project Lab I Pre: 4644 Co: 4055, 4085		1 ^[F]	MSE 4086 Senior Project Recitation II Pre: 4085 Co: 4076		1 ^[S]
MSE 4085 Senior Project Recitation I Pre: senior standing, 3884 Co: 4075 or 4095H		2 ^[F]	Physical Materials Class		3
MSE 4384 Nuclear Materials Pre:(MSE 3044 or ME 3304), (MSE 3054 or ESM 3054 or ME 3614)		3 ^[F]	NSEG 3146 Fund Nuclear Engineer II Pre: NSEG 3145 or ME 3145		3
NSEG 3145 Fund Nuclear Engineer I Pre: MATH 2214 or 2214H		3	CLE (Area 2, 3, or 7)		3
CLE (Area 2, 3, or 7)		3	CLE (Area 2, 3, or 7)		3
TOTAL		15	TOTAL		15

General Information about Checksheet: 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.

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

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) ¹	ECON 2005	(3)		(3)
CLE Area 4: Scientific Reasoning and Discovery (8 hrs)	PHYS 2305	(4)	PHYS 2306	(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				(1)
CLE Area 7: Global Issues Elective (3 hrs)				(3)

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 126 credits.

Electives: No technical electives required.

Change of Major Requirements: : Please see <http://www.engr.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 ESM Department fully supports this policy. Specific expectations for satisfactory progress for Engineering Science and Mechanics majors are as follows:

- Each student must meet the minimum University-wide criteria as described in Policy 91 and summarized in the Undergraduate Catalog (<http://www.undergradcatalog.registrar.vt.edu/1617/academic-policies.html#22>)
- Maintain an in-major GPA of 2.0 or better and an overall GPA of 2.0 or better. (In-major GPA is calculated using all courses taken under the MSE designator)
- Students may not earn a semester GPA less than 2.0 in any 2 consecutive semesters
- Students must complete a minimum of 9 credits per semester satisfying the MSE checksheet,
- A grade of C or better in MSE 2044 is required as a prerequisite for all MSE courses, and
- Students are allowed to take MSE 2044 a maximum of two times in their attempt to achieve a grade of C or better.

Statement of Hidden Prerequisites: Pre-requisites for each course are listed after the course title. The (letter grade) notation, such as (C-), indicates the minimum grade students must earn in the pre-requisite course. There are no hidden pre-requisites in the program of study. Prerequisites may change from what is indicated. Be sure to consult the University Catalog or check with your advisor for the most current pre-requisites.

Graduation Requirements: Each student must complete at least 126 semester credit hours with a minimum overall GPA of 2.00 and a minimum in-major GPA of 2.00. In-major GPA is calculated using all courses taken under the MSE designator.

Additional Checksheet Comments:

1. Programming elective: Any of the following courses may be substituted for the 2114 & 3114 pair: CS 1044, Intro Prog in C (3c), CS 1064, Intro to Prog in Python (3c), CS 1114, Intro Software Design (3cr); AOE 2074 Computational Methods (2c); BIT 2405, Quantitative Methods (3c); ECE 1574 Engr Prob Solv C++ (3c), ENGE 2514 Intro Engr Labview (2c).
2. Honors students may substitute MSE 4095H/4096H Honors Senior Project Lab for MSE 4075/4076.
3. Physical Materials Courses:
 - o MSE 3204^[F] Fund Electronic Materials Pre: 2054, PHYS 2306
 - o MSE 3304^[F,S] Physical Metallurgy Pre: 2044 (C)
 - o MSE 4414^[F] Physical Ceramics Pre: 2044 (C)
 - o MSE 4554^[F,S] Polymer Engineering Pre: 2044 (C), CHEM 1036; co: 4034.
4. ECON 2005: ISE 2014 (2c) can be substituted but an additional 3c area 3 course must be taken
5. MATH 2114 Linear Algebra (3c) may be substituted for MATH 1114 Linear Algebra (2c)
6. NSEG 5204 Nuclear Fuel Cycles (3c) may be substituted for either MSE4164 or NSEG3145 with advanced permission.