

COLLEGE OF ENGINEERING
DEPARTMENT OF MECHANICAL ENGINEERING
DEGREE: BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING
MAJOR: MECHANICAL ENGINEERING
FOR STUDENTS GRADUATING IN CALENDAR YEAR 2022 AND FOR STUDENT DATE OF ENTRY
UNDER UG CATALOG 2020-2021
CREDITS REQUIRED FOR GRADUATION: 129

FALL 2018		Credits	SPRING 2019		Credits
CHEM 1035 General Chemistry		3	ENGL 1106 First-Year Writing Pre: 1105		3
CHEM 1045 General Chemistry Laboratory Co: 1035		1	MATH 1226 Calculus of a Single Variable Pre: 1225 (C-)		4
ENGL 1105 First-Year Writing		3	MATH 2114 Introduction to Linear Algebra Pre: 1226 or 1225 (B)		3
MATH 1225 Calculus of a Single Variable (C-) Pre: Math ready		4	ENGE 1216 Foundations of Engineering (C-) Pre: 1215(C-)		2
ENGE 1215 Foundations of Engineering (C-)		2	PHYS 2305 Foundations of Physics w/lab Pre: (MATH 1205 or MATH 1205H or MATH 1225 or MATH 1206 or MATH 1206H or MATH 1226). Co: 2325 or MATH 1206 or MATH 1206H or MATH 1226.		4
Pathways 2, 3, 6a or 7		3			
TOTAL		16	TOTAL		16
FALL 2019		Credits	SPRING 2020		Credits
ESM 2104 Statics Pre: MATH 1226; Co: MATH 2204 or MATH 2204H or MATH 2224 or MATH 2406H		3	ECE 2054 Applied Electrical Theory Co: MATH 2214 (or 3054+2074, 2004+2074)		3 ^[F,S]
ISE 2214 Manufacturing Process Laboratory		1	ESM 2204 Mechanics of Deformable Bodies Pre: (2104 or 2114), MATH 2224 or MATH 2224H or MATH 2204 or MATH 2204H)		3
MATH 2204 Intro Multivariable Calculus Pre: 1226		3	ESM 2304 Dynamics Pre: (2104 or 2114, (MATH 2224 or MATH 2224H or MATH 2204 or MATH 2204H)		3
PHYS 2306 Foundations of Physics w/lab Pre: (MATH 1206 or MATH 1206H or MATH 1226), PHYS 2305		4	MATH 2214 Intro to Differential Equations Pre: 1114 or 2114 or 2114H or 2405H, 1226		3
MSE 2034 Elements of Materials Engineering Pre: CHEM 1035; Co: PHYS 2305		3	ME 2134 (C-) Thermodynamics Pre: MATH 2204, CHEM 1035, PHYS 2306; Co: MATH 2214		4 ^[F,S]
ME 2004 ⁽¹⁾ (C-) Engineering Analysis using Numerical Methods Pre: (ENGE 1216 or ENGE 1414), MATH 1226, (MATH 2114 or MATH 2114H or MATH 2405H or MATH 2214)		3 ^[F,S,SI]			
TOTAL		17	TOTAL		16
FALL 2020		Credits	SPRING 2021		Credits
STAT 3704 Statistics for Engineering Applications Pre: MATH 2224 or MATH 2224H or MATH 2204 or MATH 2204H or MATH 2406H (or 4604, 4714, or 4705)		2	Pathways 2, 3, 6a or 7		3
ME 3024 Engineering Design and Economics Pre: 2004, MSE 2034, ESM 2204, ENGL 1106; Co: 3624		3 ^[F,S]	ME 3304 ⁽¹⁾ Heat & Mass Transfer Pre: (2124 (C-) or 2134 (C-)), (MATH 2214 or MATH 2214H or MATH 2306H), (MATH 2204 or MATH 2204H or MATH 2406H)		3 ^[S,SI]
ME 3414 ⁽¹⁾ Fluid Dynamics (w lab) Pre: MATH 2114, MATH 2204, MATH 2214, 2004 (C-); Co: 2134		4 ^[F,S]	ME 3534 ⁽¹⁾ Controls Engineering I (w lab) Pre: 2004(C-), MATH 2114, MATH 2204, ESM 2104, ESM 2304		4 ^[S,SI]
ME 3524 Mechanical Vibrations Pre: 2004(C-), ESM 2304, (MATH 2114 or MATH 2114H or MATH 2405H), MATH 2214 or MATH 2214H or MATH 2406H)		4 ^[F,S]	ME 4005 ⁽¹⁾ ME Lab Pre: (3514 or 3524), (STAT 3704 or STAT 4604, or STAT 4705 or STAT 4714), (ECE 2054 or ECE 3054) or (ECE 2004, ECE 2074)		3 ^[S,SI]
ME 3624 ⁽¹⁾ Mechanical Design (w lab) Pre: ESM 2204, MATH 2214, 2004(C-)		4 ^[F,S]	Pathways 2, 3, 6a, or 7		3
			ME 3034 Mechanical Engineering Discourse Pre: ME 3024; Co: ME 4005		1 ^[S,SI]
TOTAL		17	TOTAL		17
FALL 2021		Credits	SPRING 2022		Credits
ME 4015 Engineering Design & Project Pre: 4005, (2024 or 3024), ECE 3254, (3614 or 3624), 3304, (3504 or 4504) or (3524, 3534)		3 ^[F]	ME 4016 Engineering Design & Project Pre: 4015		3 ^[S]
Technical Elective from list		3	Technical Elective from list		3
Technical Elective from list		3	Technical Elective from list		3

ME 4124 Computer Aided Design of Fluid-Thermal Systems: <i>Pre: (3124 or 2134 (C-)), (3404 or 3414), 3304</i>	3 ^[F]	Pathways 2, 3, 6a, or 7	3
Pathways Core Concept 2, 3, 6a, or 7	3	Pathways 2, 3, 6a, or 7	3
TOTAL	15	TOTAL	15

General Information about Checksheet: Superscripted annotation after the course number (1) indicates core course of the degree. Core courses are also shaded in light blue. Pathways courses are shaded in green. Additionally [F,S,SI,SII] in credits column indicates terms when a course is expected to be offered. Course offerings are subject to change and the availability of sufficient resources. Students should confirm course offerings in advance with their department. Grade requirements in specific courses are indicated in parenthesis. For example, a minimum grade of (C-) must be earned in MATH 1225. This is also shown in the prerequisite list for MATH 1226 where (C-) is indicated next to the MATH 1225 prerequisite.

Pathways to General Education (Pathways)

Consult the pathways courses table: <https://www.pathways.prov.vt.edu/about/table.html>, Pathways courses need to be completed prior to graduation

Pathways 1: Discourse (6 hrs foundational, 3 hrs advanced)	<i>Foundational: ENGL 1105</i>	(3)	<i>Foundational: ENGL 1106</i>	(3)
	<i>Advanced: ME 3024, 3034, 4015-4016</i>			(3)
Pathways 2: Critical Thinking in the Humanities (6 hrs)		(3)		(3)
Pathways 3: Reasoning in the Social Sciences (6 hrs)		(3)		(3)
Pathways 4: Reasoning in the Natural Sciences (8 hrs)	PHYS 2305	(4)	PHYS 2306	(4)
Pathways 5: Quantitative and Computational Thinking (11 hrs)	<i>Foundational: MATH 1225</i>	(4)	<i>Foundational: MATH 1226</i>	(4)
	<i>Advanced: MATH 2214</i>			(3)
Pathways 6: Critique and Practice in Design and the Arts (7 hr)	<i>Arts:</i>			(3)
	<i>Design: ENGE 1215 + 1216</i>			(4)
Pathways 7: Critical Analysis of Identity and Equity in the United States (3 hrs)				(3)

Electives: The ME degree requires 12 credits of approved technical electives from a list. A maximum of 3 credits of technical elective may be taken from List #2. Up to 9 credits of technical electives may be taken Pass/Fail. Please see attached list for technical elective choices. Note: Specific ME Majors may require additional technical elective credits and requirements.

Change of Major Requirements: Please see <http://www.enge.vt.edu/undergraduate-changing-major.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 ME Department fully supports this policy. Specific expectations for satisfactory progress for Mechanical Engineering 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/>
- Once a student is in the ME major, a student must:
 - Complete a minimum of 12 credits that apply toward the ME degree during each 12 month period
 - Maintain an in-major GPA (in-major is calculated using all courses taught under the ME and NSEG designators) of at least 2.00;
 - Maintain an extended in-major GPA (extended in-major is calculated using all courses taught under the ME and NSEG designators plus ESM 2104, 2204 and 2304) of at least 2.00
 - Complete ESM 2104, MATH 2114 and MATH 2204 within 45 attempted required course credits (not to include Pathways courses, technical electives or free electives)
 - Complete ESM 2304, ME 2004 and MATH 2214 within 60 attempted required course credits (not to include Pathways courses, technical electives or free electives)
 - Complete ME 2134(C-), 3524, and 3624 with 72 attempted required course credits (not to include Pathways courses, technical electives or free electives)
 - Complete ME 4015, and 4124 within 90 attempted required course credits (not to include Pathways courses, technical electives or free electives)

Statement of Hidden Prerequisites: Prerequisites may change. Students are responsible for pre-requisites and pre-requisites of pre-requisites whether specifically spelled out or not on this checksheet. Be sure to consult the University TimeTable or check with your advisor for the most current requirements. There are no hidden pre-requisites in this program of study.

Graduation Requirements: Each student must complete at least 129 semester credit hours with a minimum overall GPA of 2.00 and a minimum in-major GPA of 2.00. In-major GPA is determined from all courses with ME and NSEG (nuclear) designators.

Department of Mechanical Engineering Technical Elective List #2 – Maximum of 3 credits from this list

Biological Systems Engineering (BSE): 2484.

Biomedical Engineering (BMES): 2104.

Chemistry (CHEM): 2514

Computer Science (CS): 2114, 2505, 3114.

English (ENGL): 4804.

Education, Curriculum & Instruction (EDCI): 4454.

Electrical & Computer Engineering (ECE): 2164.

Engineering Education (EngE): 4094.

French (FR): 2105, 2106, 3105, 3106. Credit is only granted if 9 additional engineering credits (taught in French) are earned at a foreign educational institution after completion of these language courses***.

German (GER): 2105, 2106, 3105, 3106. Credit is only granted if 9 additional engineering credits (taught in German) are earned at a foreign educational institution after completion of these language courses***.

Industrial Design (IDS): 2044, 3124.

Industrial and Systems Engineering (ISE): 2204.

Mechanical Engineering (ME): 2984**, 4454, 4974*, 4994*, 5974*.

Russian (RUS): 2105, 2106, 3105, 3106. Credit is only granted if 9 additional engineering credits (taught in Russian) are earned at a foreign educational institution after completion of these language courses***.

Spanish (SPAN): 2105, 2106, 3105, 3106. Credit is only granted if 9 additional engineering credits (taught in Spanish) are earned at a foreign educational institution after completion of these language courses***.

*Any 4974, 4994, and 5974 course from any department on List #1 or #2 other than ME must be approved on an individual course basis; see departmental advisor to request technical elective credit for these courses. All 4974, 4994, and 5974 courses (whether from ME or another department) count toward the 6 credit limit associated with List #2.

**Any 2984, 3984, 4984 course from any department on List #1 or #2 must be approved on an individual course basis; see departmental advisor to request technical elective credit for these courses. The approval process for ME 2984, ME 3984 and ME 4984 courses will also determine whether they count toward the 6 credit limit associated with List #2.

*** See departmental advisor to request technical elective credit for the foreign language courses after you have completed your 9 credits of technical courses in that language at a foreign institution.

NOTE #1: Students are responsible for checking the prerequisite courses for any listed technical elective course. Many courses on the lists require one or more prerequisite courses. Students may need to get permission from the department offering a course to sign up for non-ME courses.

NOTE #2: A student will not receive technical elective credit for more than one course covering essentially the same material. If two courses have similar descriptions or appear to partially duplicate material, students should check with their academic advisor before attempting to take both for technical elective credit (or if the technical elective partially duplicates material in any required ME course).

Department of Mechanical Engineering Technical Elective Lists for Students Graduating in 2022

Technical electives must be selected from either List #1 or a combination of Lists #1 and List #2.
A maximum of 3 credits are allowed from List #2.

Department of Mechanical Engineering Technical Elective List #1

Aerospace and Ocean Engineering (AOE): Any 3000 or 4000 level AOE course except 3014, 3034, 3044, 3054, 3094, 3984**, 4004, 4024, 4065, 4066, 4234, 4974*, 4984**, 4994*.

Biological Systems Engineering (BSE): 3324, 3334, 3504, 3524, 4304, 4344, 4544, 4604.

Biomedical and Veterinary Science (BMVS): 4064.

Biomedical Engineering (BMES): Any non-duplicating 3000 or higher level BMES courses except 3984**, 4974*, 4984**, 4994* & 5974*.

Building Construction (BC): Any 3000 or 4000 level BC course except 3984**, 4974*, 4984**, and 4994*.

Chemical Engineering (CHE): 3134, 3144, 3184, 4104, 4185, 4186, 4214, 4224, 4544.

Chemistry (CHEM): 3615, 3616, 3625, 3626, 4074, 4114, 4124, 4404, 4424, 4524, 4534, 4554, 4615, 4616, 4634, 4734.

Civil and Environmental Engineering (CEE): Any 3000 or 4000 level CEE course except: 3304, 3684, 3984**, 4804, 4974*, 4984**, and 4994*.

Computer Science (CS): 3214, 3304, 3704, 3714, 3724, 3744, 3754, 3824, 4104, 4114, 4204, 4214, 4234, 4244, 4254, 4304, 4414, 4504, 4570, 4604, 4704, 4804.

Electrical and Computer Engineering (ECE): Any 3000 or 4000 level ECE course except 3054, 3204, 3274, 3714, 3984**, 4584, 4704, 4805-4806, 4974*, 4984**, 4994*.

Engineering (ENGR): 3124, 4134.

Engineering Science and Mechanics (ESM): 3054, 3064, 3124, 3154, 3334, 4024, 4044, 4084, 4105, 4106, 4114, 4154, 4204, 4224, 4234, 4245, 4246, 4304, 4444, 4614, 4734.

Geological Sciences (GEOS): 3104, 4164.

Industrial and Systems Engineering (ISE): 3004, 3414, 3614, 3624, 4004, 4015, 4204, 4264, 4304, 4404, 4414, 4424, 4624, 4644, 4654.

Materials Science and Engineering (MSE): Any 3000 or 4000 level MSE course except 3094, 3114, 3344, 3354, 3884, 3984**, 4075, 4076, 4085, 4086, 4894, 4974*, 4984**, 4994*.

Mathematics (Math): 3034, 3214, 3224, 4124, 4175, 4225, 4226, 4234, 4245, 4246, 4425, 4426, 4445, 4446, 4564, 4574.

Mechanical Engineering (ME): Any non-required or non-duplicating 3000 or higher level ME course except 3124, 3134, 3404, 3514, 3614, 3504, 3984**, 4454, 4504, 4974*, 4984**, 4994*, and 5974*.

Mining and Minerals Engineering (MINE): Any 3000 and 4000 level MINE course except: 3984**, 4535, 4536, 4554, 4974*, 4984**, 4994*.

Nuclear Engineering (NSEG): Any non-duplicating 3000 or higher level NSEG course except: 3984**, 4974*, 4984**, 4994*.

Physics (PHYS): 3355, 3356, 3405, 3406, 3655, 3656, 3704, 4315, 4316, 4455, 4456, 4504, 4554, 4574, 4614, 4624, 4674, 4714.

Statistics (STAT): Any 3000 or 4000 level Stat course except: 3XXX, 3005, 3006, 3604, 3615, 3616, 3704, 3984**, 4524, 4604, 4705, 4706, 4714, 4804, 4964, 4974*, 4984**, 4994*.

Urban Affairs and Planning (UAP): 4374, 4394.