

COLLEGE OF ENGINEERING
DEPARTMENT OF MECHANICAL ENGINEERING
BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING
FOR STUDENTS GRADUATING IN CALENDAR YEAR 2021
131 CREDITS REQUIRED FOR GRADUATION

FALL SEMESTER FRESHMAN 2017		Credits	SPRING SEMESTER FRESHMAN 2018		Credits
CHEM 1035 General Chemistry		3	ENGL 1106 First-Year Writing <i>Pre: ENGL 1105</i>		3
CHEM 1045 General Chemistry Lab <i>Co: CHEM 1035</i>		1	MATH 1226 Calculus of a Single Variable <i>Pre: MATH 1225 (C-)</i>		4
ENGL 1105 First-Year Writing		3	MATH 2114 Intro to Linear Algebra <i>Pre: MATH 1226 or MATH 1225 (B)</i>		3
MATH 1225 Calculus of a Single Variable (C-) <i>Pre: Math Ready</i>		4	PHYS 2305 Found of Physics I w/lab <i>Pre: MATH 1225; Co: MATH 1226</i>		4
ENGE 1215 Foundations of Engineering (C-)		2	ENGE 1216 Foundations of Engineering (C-) <i>Pre: ENGE 1215 (C-)</i>		2
CLE (Area 2, 3, or 7)		3	CLE (Area 6)		1
	TOTAL	16		TOTAL	17
FALL SEMESTER SOPHOMORE 2018		Credits	SPRING SEMESTER SOPHOMORE 2019		Credits
ESM 2104 Statics <i>Co: MATH 2204</i>		3	ECE 2054 Applied Electrical Theory <i>Pre: PHYS 2306 Co: MATH 2214 OR (ECE 3054 + 2074) OR (ECE 2004 + 2074)</i>		3-4 ^[F,S]
ISE 2214 Manufacturing Process Lab <i>Pre: ENGE 1216 (C-)</i>		1	ESM 2204 Mechanics of Deformable Bodies <i>Pre: ESM 2104, MATH 2204</i>		3
MATH 2204 Multivariable Calculus <i>Pre: MATH 1226</i>		3	ESM 2304 Dynamics <i>Pre: ESM 2104, MATH 2204 Co: MATH 2214</i>		3
PHYS 2306 Foundations of Physics I w/lab <i>Pre: MATH 1226, PHYS 2305</i>		4	MATH 2214 Introduction to Differential Equations <i>Pre: MATH 1226, MATH 2114</i>		3
ME 2024 Introduction to Design and Economics <i>Pre: ENGE 1216 (C-) Co: ESM 2104, PHYS 2306, MATH 2114</i>		3 ^[F,S]	STAT 3704 Statistics for Engineering Applications <i>Pre: MATH 2204 (or STAT 4604, 4714, or 4705)</i>		2-3
Programming Elective (Choose from AOE 2074, CS 1044, CS 1054, CS 1064, CS 1114, CS 1124, ECE 1574, ENGE 2514 or ME 2004)		2-3	ME 2124 (C-) Intro Thermal Fluid <i>Pre: MATH 2114, ESM 2104 or PHYS 2306 Co: MATH 2214</i>		2 ^[F,S,SI]
	TOTAL	16-17		TOTAL	16-18
FALL SEMESTER JUNIOR 2019		Credits	SPRING SEMESTER JUNIOR 2020		Credits
ECE 3254 Industrial Electronics <i>Pre: ECE 2054</i>		3 ^[F,S]	MSE 2034 Elements of Materials Engineering <i>Pre: CHEM 1035; Co: PHYS 2305</i>		3
ME 3124 Thermodynamics <i>Pre: ME 2124 (C-), MATH 2214, MATH 2204</i>		3 ^[F,S]	ME 3304 Heat & Mass Transfer <i>Pre: ME 2124(C-), MATH 2214, MATH 2204</i>		3 ^[S,SI]
ME 3404 Fluid Mechanics <i>Pre: ME 2124 (C-), MATH 2214, MATH 2204</i>		3 ^[F,S]	ME 3504 Dyn Sys Vibrations <i>Pre: ME 3514, MATH 2214</i>		3 ^[S,SI]
ME 3514 System Dynamics <i>Pre: ESM 2104, ESM 2304, MATH 2204, MATH 2114, MATH 2214</i>		3 ^[F,S,SI]	OR ME 4504 Control Engr I <i>Pre: ME 3514, MATH 2214</i>		OR 3 ^[F,S]
ME 3614 Mechanical Design I <i>Pre: ESM 2204, MATH 2114, MATH 2214</i>		3 ^[F,S]	ME 4005 ME Lab <i>Pre: ME 3514, ECE 2054 or ECE 2074, STAT 3704 Co: ECE 3254</i>		3 ^[S,SI]
CLE (Area 2, 3, or 7)		3	Technical Elective from list		3
	TOTAL	18		TOTAL	15
FALL SEMESTER SENIOR 2020		Credits	SPRING SEMESTER SENIOR 2021		Credits
ME 4006 ME Lab <i>Pre: 4005, ECE 3254</i>		3 ^[F]	ME 4016 Engineering Design and Project <i>Pre: ME 4015</i>		3 ^[S]
ME 4015 Engineering Design and Project <i>Pre: ME 2024, ME 4005, ME 3304, (ME 3504 OR ME 4504), ME 3614, ECE 3254</i>		3 ^[F]	Technical Elective from list		3
ME 4124 Computer Aided Design of Fluid-Thermal Systems <i>Pre: ME 3124, ME 3304, ME 3404</i>		3 ^[F]	Technical Elective from list		3
Technical Elective from list		3	CLE (Area 2, 3, or 7)		3
Technical Elective from list		3	CLE (Area 2, 3, or 7)		3
CLE (Areas 2, 3, or 7)		3			
	TOTAL	18		TOTAL	15

General Information about Checksheet: Superscripted annotation [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.

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)		(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)
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 131 credits.

Electives: The ME degree requires 15 credits of approved technical electives from list. A maximum of 6 credits of technical elective may be taken from List #2. Up to 12 credits of technical electives may be taken for a grade or Pass/Fail. Please see attached list for technical elective choices.

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 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/1617/academic-policies.html#22><http://www.undergradcatalog.registrar.vt.edu/1617/academic-policies.html#22>)
- 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 CLE courses, technical electives or free electives)
 - Complete ESM 2304, ME 2124 and MATH 2214 within 60 attempted required course credits (not to include CLE courses or technical electives)
 - Complete ME 3124, 3514, and 3614 with 72 attempted required course credits (not to include CLE courses or technical electives)
 - Complete ME 4006, 4015, and 4124 within 90 attempted required course credits (not to include CLE courses or technical 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 131 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.

APPROVED
University Registrar

Department of Mechanical Engineering Technical Elective Lists for Students Graduating in 2021

Technical electives must be selected from either List #1 or a combination of Lists #1 and List #2.
A maximum of 6 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, 3094, 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 4974*, 4984**, 4994* & 5974*.

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

Chemical Engineering (CHE): 3134, 3144, 3184, 4104, 4134, 4185, 4186, 4214, 4224, 4544.

Chemistry (CHEM): 3114, 3124, 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, 4034, 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, 3254, 3274, 4324, 4405, 4406, 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, 3884, 4075, 4076, 4085, 4086, 4894, 4974*, 4984**, 4994*.

Mathematics (Math): 3034, 3214, 3224, 4124, 4175, 4225, 4226, 4234, 4245, 4246, 4404, 4425, 4426, 4445, 4446, 4564, 4574.

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

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

Nuclear Engineering (NSEG): Any non-duplicating 3000 or higher level NSEG course except: 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, 3704, 3615, 3616, 4604, 4524, 4705, 4706, 4714, 4804, 4964, 4974*, 4984**, 4994*.

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

Department of Mechanical Engineering Technical Elective List #2 – Maximum of 6 credits from this list

Biological Systems Engineering (BSE): 2484.

Biomedical Engineering (BMES): 2104.

Chemistry (CHEM): 2514, 2535, 2536, 2545, 2546.

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

English (ENGL): 3764, 3814, 4804, 4814, 4824.

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): 2014, 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).