

COLLEGE OF ENGINEERING
DEPARTMENT OF INDUSTRIAL AND SYSTEMS ENGINEERING
BACHELOR OF SCIENCE IN INDUSTRIAL AND SYSTEMS ENGINEERING
FOR STUDENTS GRADUATING IN CALENDAR YEAR 2017
133 CREDITS REQUIRED FOR GRADUATION

FALL SEMESTER FRESHMAN 2013		Credits	SPRING SEMESTER FRESHMAN 2014		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 1206 Calculus II <i>Pre: Math 1205</i>		3
ENGL 1105 First-Year Writing		3	MATH 1224 Vector Geometry <i>Pre: MATH 1205</i>		2
MATH 1114 Elementary Linear Algebra		2	PHYS 2305 Found of Physics I w/lab <i>Pre: MATH 1205; Co: MATH 1206</i>		4
MATH 1205 Calculus I <i>Pre: Math Ready</i>		3	ENGE 1104 Exploration Digital Future (C-) or ENGE 1114 Engineering Exploration (C-) <i>Pre: ENGE 1024</i>		2
ENGE 1024 Engineering Exploration (C-) <i>Co: MATH 1205</i>		2	CLE (Area 2, 3, or 7)		3
CLE (Area 2, 3, or 7)		3			
TOTAL		17	TOTAL		17
FALL SEMESTER SOPHOMORE 2014		Credits	SPRING SEMESTER SOPHOMORE 2015		Credits
CS 1044 Intro to Programming in C OR CS 1064 Intro to Programming in Python		3	MATH 2214 Differential Equations (C-) <i>Pre: MATH 1206, 1114</i>		3
MATH 2224 Multivariable Calculus (C-) <i>Pre: MATH 1206, 1224</i>		3	STAT 4105 Theoretical Statistics (C-) <i>Pre: MATH 2224</i>		3
PHYS 2306 Foundations of Physics II w/lab <i>Pre: MATH 1206, PHYS 2305</i>		4	ESM 2304 Dynamics <i>Pre: ESM 2104</i>		3
ESM 2104 Statics <i>Pre: MATH 1114</i>		3	ISE 2034 Data Management for ISEs (C-) <i>Pre: ISE 2004, ISE 2214, CS 1044 or CS 1064</i>		3 ^[S, SI]
ISE 2014 Engineering Economy (C-) <i>Pre: ENGE 1024</i>		2 ^[F, S, SI, SI]	ISE 2204 Manufacturing Processes (C-) <i>Pre: ENGE 1104, 1114 or ENGE 1434</i>		3 ^[F, S]
ISE 2214 Manufacturing Processes Lab (C-) <i>Pre: ENGE 1104 or 1114</i>		1 ^[F, S, SI]	ISE 2404 Deterministic Oper Research I (C-) <i>Co: MATH 2224</i>		3 ^[S, SI]
ISE 2004 Intro to ISE (C-) <i>Pre: ENGE 1104 or 1114</i>		2 ^[F, SI]			
TOTAL		18	TOTAL		18
FALL SEMESTER JUNIOR 2015		Credits	SPRING SEMESTER JUNIOR 2016		Credits
ECE 3054 Electrical Theory <i>Pre: PHYS 2306 Co: MATH 2214</i>		3	ISE 3214 Facilities and Logistics (C-) <i>Pre: ISE 2014, 2404, 3414, 3434</i>		3 ^[S, SI]
STAT 4706 Statistics for Engineers (C-) <i>Pre: STAT 4105</i>		3	ISE 4404 Statistical Quality Control (C-) <i>Pre: ISE 3414, STAT 4105, STAT 4706</i>		3 ^[S, SI]
ISE 3414 Probabilistic Oper Research (C-) <i>Pre: MATH 2214, MATH 2224, CS 1044 or 1064, STAT 4105</i>		3 ^[F, SI]	ISE 3424 Discrete-Event Comp Sim (C-) <i>Pre: ISE 3414, STAT 4105</i>		3 ^[S, SI]
ISE 3434 Deterministic Oper Research II (C-) <i>Pre: ISE 2404, MATH 2224</i>		3 ^[F, SI]	ISE 3624 Ind Ergo & Work Meas (C-) <i>Pre: ISE 3614, ESM 2104</i>		3 ^[S, SI]
ISE 3614 Intro to Hum Factors Engr & Ergo (C-) <i>Pre: ISE 2034, ISE 2204 or 2214, STAT 4105</i>		3 ^[F, SI]	CLE (Area 2, 3, or 7)		3
CLE (Area 2, 3, or 7)		3			
TOTAL		18	TOTAL		15
FALL SEMESTER SENIOR 2016		Credits	SPRING SEMESTER SENIOR 2017		Credits
ISE 4005 Proj Mgmt & System Design (C-) <i>Pre: ISE 2204, 2214, 3214, 3424, 3434, 3624, 4404</i>		3	ISE 4006 Proj Mgmt & System Design <i>Pre: ISE 4005, 4204</i>		2
ISE 4204 Production Planning and Inv Ctrl (C-) <i>Pre: ISE 2404, 3414, STAT 4706</i>		3	ISE 4214 Lean Manufacturing <i>Pre: ISE 4204</i>		3
CLE (Area 2, 3, or 7)		3	Technical Elective		3
CLE (Area 6)		1	ISE Technical Elective		3
Technical Elective		3	Free Elective		3
ISE Technical Elective		3			
TOTAL		16	TOTAL		14

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 (6 hrs)	MATH 1205	(3)	MATH 1206	(3)
CLE Area 6: Creativity & Aesthetic Experience elective (1 hr)				(1)
CLE Area 7: Global Issues Elective (3 hrs) ^{1,2}				(3)
¹ If a CLE course is double-counted to satisfy two different CLE areas, additional credits must be taken to maintain a minimum of 133 credits.				
² A total of 6 credits of Area 2 and 6 credits of Area 3 courses must be completed. Only selected courses can simultaneously satisfy both Area 2/3 & 7 requirements. Use extra care when selecting this course.				
Electives				
The ISE degree requires 6 credits of ISE Technical Electives from list, 6 credits of Technical Electives, and 3 credits of Free Electives. Free Electives or Area 6 courses offered only on a P/F basis may be taken under the P/F grading option.				
Change of Major Requirements: To enter this restricted major, students must have a: 1) Minimum 2.0 overall Virginia Tech GPA; 2) Minimum grade of C- or better in ENGE 1024 and ENGE 1104 or 1114; 3) Minimum grade of D- or better in CHEM 1035, CHEM 1045, ENGL 1105, ENGL 1106, MATH 1205, MATH 1206, MATH 1224, and PHYS 2305. NOTE: Students who have completed all of the required coursework and have a 3.0 or higher Virginia Tech GPA are guaranteed this major. Change of Major applications are accepted prior to the beginning of fall, spring, and summer at: http://www.enge.vt.edu/undergraduate/undergraduate-changing-majors				
Foreign Language Requirements: Students must have had 2 years of a foreign language in high school or one year at the college level (6 credits) 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 ISE Department fully supports this policy. Specific expectations for satisfactory progress for Industrial & Systems Engineering majors are as follows:				
<ul style="list-style-type: none"> • Each student must meet the minimum University-wide criteria as described in Policy 91 and summarized in the Undergraduate Catalog (under Academic Policies) • After having completed 72 credit hours (including transfer, advanced placement, advanced standing, and credit by examination) must meet the following criteria: <ul style="list-style-type: none"> ○ Minimum in-major GPA of 2.0 or better (In-major GPA is determined from all ISE and STAT classes), ○ Have completed ISE 2004, 2014, 2034, 2204, 2214, ISE 2404, STAT 4105, MATH 2214, MATH 2224, and ○ Be enrolled in 12 or more credits of ISE classes per year 				
Prerequisites: Pre-requisites for each course are listed after the course title. All ISE courses require a C- or better in prerequisite ISE, STAT, and MATH courses. There are no hidden pre-requisites in this program of study.				
Course Availability: Course offerings are subject to change; students should consult an ISE academic advisor or the University Timetable for course offerings each semester.				
Graduation Requirements: Each student must complete at least 133 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 ISE and STAT courses. Courses on the College of Engineering list of non-degree credit may not be taken for credit towards graduation (list found at www.eng.vt.edu/forms)				

Electives for ISE 2017 Checksheet

General Notes

- Some courses may not be available to all students due to pre-requisite requirements or due to major restrictions by the offering department. Students should carefully note any pre-requisites and the number of credits for any course.
- Courses with substantial duplication of courses required for the BSISE will not qualify for credit; if in doubt, check with an ISE Academic Advisor.

ISE Technical Electives

The purpose of this requirement is to enable students to develop expertise in a particular area of the ISE discipline.

Requirements:

- 6 credits of ISE Technical Electives at the 3000 or 4000 level must be taken from the list below.
- A maximum of 3 credits of ISE 4974 or ISE 4994 is allowed without prior approval. Students wishing to take more than 3 credits of ISE 4974 or ISE 4994 must obtain permission from the ISE Undergraduate Program Director.
- Students pursuing a Minor may need to select specific courses as ISE Technical Electives, Technical Electives, or Free Electives to satisfy the Minor requirements.

ISE 3004 Industrial Cost Control (Pre: ISE 2014 or ME 2024)

ISE 4004 Theory of Organization

ISE 4015 Management Systems Theory, Applications, and Design I

ISE 4264 Industrial Automation (Requires Laboratory Work) (Pre: ISE 2204 or 2214)

ISE 4304 Global Issues in Industrial Management

ISE 4414 Industrial Quality Control (Pre: ISE 4404)

ISE 4424 Logistics Engineering (Pre: ISE 3414)

ISE 4624 Work Physiology (Pre: ISE 3624)

ISE 4644 Occupational Safety and Hazard Control (Pre: ISE 3614)

ISE 4654 Principles of Industrial Hygiene

ISE 4974 Independent Study (Hours and credits established by faculty supervising work)

ISE 4994 Undergraduate Research (Hours and credits established by faculty supervising work)

Technical Electives

The purpose of this requirement is for students to further develop technical skills and to provide the opportunity to focus on a particular technical area by taking electives with significant technical content.

Requirements:

- 6 credits of Technical Electives must be taken on an A/F basis; any courses offered only as P/F must be approved in advance (see ISE Academic Advisor).
- Up to 3 ISE credits may be used to satisfy this requirement, while 3 credits must be taken outside of ISE.
- Courses allowed as Technical Electives (see exceptions noted below):
 - Any 3000 or 4000 level course from the College of Engineering: AOE, BMES, BSE, CEE, CHE, CNST, CS, ECE, ESM, ME, MSE, MINE;
 - Any 3000 or 4000 level course from the College of Science: BCHM, BIOL, BMVS, CHEM, CMDA, GEOS, ISC, MATH, NANO, PHYS, STAT;
 - ENGR 3124 and ENGR 4134;
 - If there is a course of interest in a department other than those listed above, students may request approval from the ISE Undergraduate Program Director;
- Courses not allowed: CEE 4804, CHEM 4014, CS 3604, CS 4214, MATH 4044, MATH 4625-6, MATH 4644, MATH 4664, MINE 4524, MINE 4554, STAT 3005, STAT 3615, STAT 3704, STAT 4604, STAT 4705, or STAT 4714.
- Students pursuing a Minor may need to select specific courses as Technical Electives to satisfy the Minor requirements.

Free Electives

The purpose of this requirement is to enable students to enhance or complement knowledge and skills by providing breadth in areas outside of ISE.

Requirements:

- 3 credits of Free Electives must be taken.
- Students may not use a given course to satisfy both Free Elective requirements and CLE requirements. Any given course will satisfy only one requirement.
- Students pursuing a Minor may need to select specific courses as Free Electives to satisfy the Minor requirements.



Academic Affairs
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E-mail: engris@vt.edu
http://www.eng.vt.edu/overview/acad_affairs.php

To: Engineering Undergraduates
From: Erik Westman, Associate Dean, Academic Affairs
Subject: Non-degree credit

DATE: April 2014

Please be aware that not all courses at Virginia Tech will count toward an undergraduate engineering degree. Such courses may not be used to satisfy any graduation requirement, including free electives. Listed below are courses which do not count toward an undergraduate engineering degree. This list is not exhaustive, so if you have any questions, you should check with your engineering department about additional non-credit courses. This list is updated periodically. Be sure to review the list each semester at: <https://www.eng.vt.edu/sites/default/files/pageattachments/non-degreecourses.pdf>

CHEM 1015-1016 (Introduction to Chemistry)

CHEM 1025-1026 (Introduction to Chemistry Laboratory)

CS 1004 (Computer Literacy), (no credit awarded to CS majors for these courses: CS 4004, 4014)

UNIV or EDCI 1004 (College Success Strategies), 1014 (Cadet Success Seminar), 1704 (First Year Seminar Course), 2004 (Exploring Careers), 4974 (Independent Study), 2984 (Special Study: Any Subtitle), 4984 (Special Study: Any Subtitle)

ENGE 1354 (Spatial Visualization)

EF/ENGE 2984 (Engineering Success Seminar)

ENGL 1004, 0014 (English as a Second Language)

ENGR 1034 (First Year Hypatia Seminar)

ENGR 1054 (First Year Galileo Seminar)

ENGR 3004 Mentoring Seminar; ENGR 4984 (CEED Team Leader Seminar)

ESM 2984 (ESP Statics, Prof Dev Sem for ESM), ESM 4404 (Fundamentals of Professional Engineering)

FCD 2984 (Success Project)

HD 2984 (Healthy Living, Success Project)

MaSc 1024, 1025, 1026 (Mathematics, A Liberal Arts Approach), 1034 (Statistics, A Liberal Arts Approach), 1044 (Computer Science, A Liberal Arts Approach)

MATH 1504 (PreCalc), 2984 (Emerging Scholar), 1015 (Elem Calc with Trig. CS majors may receive 1015 credit if taken before 1205), 1016 (Elementary Calc with Trig), 1525-1526 (Elementary Calc with Matrices), 2015-2016 (Elementary Calc with Trig II)

ME 4984 (SAE Automotive Essentials)

PHYS 2205-2206 (General Physics; not Calc-based)

PSYC 2984 (First Year Experience, Athletic Transitions)

Invent the Future