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College of Engineering
Bachelor of Science in Engineering Science and Mechanics
For Students Graduating in Calendar Year 2016

Freshman Year

Fall Semester			Spring Semester		
CHEM 1035 General Chemistry	3		ENGE 1114 Exploration of Engineering Design[1]	2	
CHEM 1045 General Chemistry Lab	1		ENGL 1106 First-Year Writing	3	
ENGE 1024 Engineering Exploration[1]	2		MATH 1206 Calculus	3	
ENGL 1105 First-Year Writing	3		MATH 1224 Vector Geometry	2	
MATH 1205 Calculus	3		PHYS 2305 Foundations of Physics I and Lab	4	
MATH 1114 Linear Algebra	2		Area 2/3 & 7 Liberal Education[2]	3	
Area 2/3 Liberal Education[2]	3				
TOTAL HOURS	17		TOTAL HOURS	17	

Sophomore Year

Fall Semester			Spring Semester		
ESM 2014 Intro to ESM	1		ESM 2204 Mechanics of Deformable Bodies	3	
ESM 2104 Statics	3		ESM 2304 Dynamics	3	
CS Programming Course[3]	3		CS/MATH 3414 Numerical Methods	3	
MATH 2214 Intro to Diff Equations	3		ECE 3054 Electrical Theory	3	
MATH 2224 Multivariable Calculus	3		MSE 2034 Elements Materials Engr.	3	
PHYS 2306 Foundations of Physics I and Lab	4		Area 2/3 Liberal Education[2]	3	
TOTAL HOURS	17		TOTAL HOURS	18	

Junior Year

Fall Semester			Spring Semester		
ESM 3234 Fluid Mech I-Control Volumes	3		ESM 3334 Fluid Mech II-Differential Analysis	3	
ESM 3124 Dyn II-Analytical & 3D Motion	3		ESM 3134 Dyn III-Vibration and Control	3	
ESM 3054 Mechanical Behavior of Materials	3		ESM 3154 Solid Mechanics	3	
ESM 3064 Mechanical Behavior of Materials Lab	1		ESM 3444 Mechanics Laboratory	2	
ESM 3034 Fluid Mechanics Laboratory	1		ESM 3114 Prob Definition Scoping in Design	1	
MATH 4564 Operational Methods	3		MATH 4574 Vector & Complex Analysis	3	
Science Elective[4]	3		Technical Elective[5]	3	
TOTAL HOURS	17		TOTAL HOURS	18	

Senior Year

Fall Semester			Spring Semester		
ESM 4015 Creative Design & Proj. I	3		ESM 4016 Creative Design & Proj. II	3	
ESM 4734 Introduction to Finite Elements	3		Technical Elective[5]	3	
STAT 4604 Statistical Methods for Engineers	3		Technical Elective[5]	3	
Thermodynamics Elective[6]	3		Area 2/3 Liberal Education[2]	3	
Technical Elective[5]	3		Area 6 Liberal Education	1	
TOTAL HOURS	15		TOTAL HOURS	13	

A TOTAL OF 132 SEMESTER HOURS ARE REQUIRED FOR GRADUATION.
An in-major (all ESM classes) GPA of 2.0 and an overall GPA of 2.0 are required for graduation.

Eligibility for continued enrollment: To remain enrolled in the Engineering Science and Mechanics Department a student must meet the following conditions for satisfactory progress toward a BSESM degree: (1) after having completed 72 credit hours (including transfer, advanced placement, advanced standing, and credit by examination) must have completed ESM 2014, 2104, 2204, 2304, MATH 2214, 2224, and PHYS 2305, 2306; (2) maintain an in-major GPA and an extended in-major (all ESM courses and MATH 2214, 2224, 4564, and 4574) GPA of 2.0 or better; (3) complete a minimum of 12 credits (not including withdrawal credit) that apply toward the BSESM degree per academic year (including summer and winter sessions).

Foreign Language Requirement: Students who did not complete 2 units of foreign language in high school must earn 6 credit hours of a college level foreign language, such credits to be in addition to those normally required for graduation.

[1] ENGE 1434: Fundamentals of Engineering (5 cr.) may be substituted for ENGE 1024 and ENGE 1114.

[2] A total of 6 hours of Area 2 and 6 hours 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.

[3] CS Programming Course chosen from: CS 1044, CS 1064, or CS 1114. Students interested in a CS major or minor should take CS 1114.

[4] Science Elective chosen from: BCHM, BIOL, BMVS, CHEM, GEOS, or PHYS. This requirement is in addition to CHEM 1035, 1045 and PHYS 2305, 2306.

[5] See attached list for approved technical electives. Additional technical electives are possible with the approval of the Director of Undergraduate Studies. Note that the listed technical electives may contain hidden prerequisites.

[6] *Thermodynamics Elective chosen from: BSE 3154, ME 3134, or PHYS 3704.*

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Approved Technical Electives:

ESM 4014: Applied Fluids
ESM 4024: Advanced Mechanical Behavior of Materials
ESM 4044: Mechanics of Composite Materials
ESM 4084: Engineering Design Optimization
ESM 4105-4106: Engineering Analysis of Physiologic Systems
ESM 4114: Nonlinear Dynamics and Chaos
ESM 4194: Sustainable Energy Solutions for a Global Society
ESM 4204: Musculoskeletal Biomechanics
ESM 4224: Biodynamics & Control
ESM 4245-6: Mechanics of Animal Locomotion
ESM 4994: Undergraduate Research
ESM 5014: Introduction to Continuum Mechanics
ESM 5405 or 5406: Clinical Internship in Biomedical Engineering
AOE 3024: Thin-Walled Structures
AOE 3124: Aerospace Structures
AOE 3224: Ocean Structures
AOE 3134: Stability and Control
AOE 4134: Astromechanics
AOE 4144: Aircraft Automatic Flight Control
AOE 4214: Ocean Wave Mechanics
CEE 3404: Theory of Structures
CEE 3424: Reinforced Concrete Structures I
CEE 3434: Design of Steel Structures I
ECE 3105-3106: Electromagnetic Fields
ECE 4405-4406: Control Systems
ENGR 3124: Introduction to Green Engineering
ENGR 3134: Environmental Life Cycle Analysis
ME 3304: Heat and Mass Transfer
ME 4224: Aircraft Engines and Gas Turbines
ME 4234: Aerospace Propulsion Systems
ME 4504: Dynamic Systems Controls Engineering I
ME 4524: Introduction to Robotics and Automation
MSE 4055: Materials Selection and Design I
MSE 4164: Corrosion
MSE 4304: Metals and Alloys
MSE 4574: Biomaterials
MSE 4614: Nanomaterials
CHEM 2535-2536: Organic Chemistry
CHEM 2545-2546: Organic Chemistry Laboratory
MATH 3214: Calculus of Several Variables
MATH 4234: Elementary Complex Analysis
MATH 4445-4446: Introduction to Numerical Analysis
PHYS 3324: Modern Physics
PHYS 3405-3406: Intermediate Electricity and Magnetism
PHYS 4455-4456: Introduction to Quantum Mechanics
PHYS 4504: Introduction to Nuclear and Particle Physics
PHYS 4714: Introduction to Biophysics

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VirginiaTech
College of Engineering

Academic Affairs
212 Hancock Hall (0275)
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540/231-3244 Fax: 540/231-1831
E-mail: engris@vt.edu
http://www.eng.vt.edu/overview/acad_affairs.php

To: Engineering Undergraduates
From: Bevlee Watford, Associate Dean, Academic Affairs
Subject: Non-degree credit

DATE: June 2013

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: http://www.eng.vt.edu/overview/acad_affairs_whatwedo.php

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)

EF/ENGE 2984 (Engineering Success Seminar)

ENGL 1004, 0014 (English as a Second Language)

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)