Colorado State University

DEPARTMENT OF MECHANICAL ENGINEERING
UNDERGRADUATE CURRICULUM GUIDE
Fall 2011

The mechanical engineering undergraduate curriculum at CSU is designed to provide both classroom learning and on-campus experiential engineering. A number of courses incorporate laboratory and design projects into the classroom experience. During the freshman year, students learn the basic fundamentals of the physical sciences and mathematics, and are introduced to the mechanical engineering profession and practice. In the sophomore year, basic engineering courses in mechanics and thermodynamics, as well as introductory design courses are taken. In the junior year, engineering analysis and laboratory classes in mechatronics, mechanisms, thermal/fluids, heat and mass, and mechanics are part of the curriculum. The senior year has a yearlong capstone design course in which students work on group design/engineering projects for the entire year. The senior year also has technical elective courses in specialty areas of mechanical engineering.

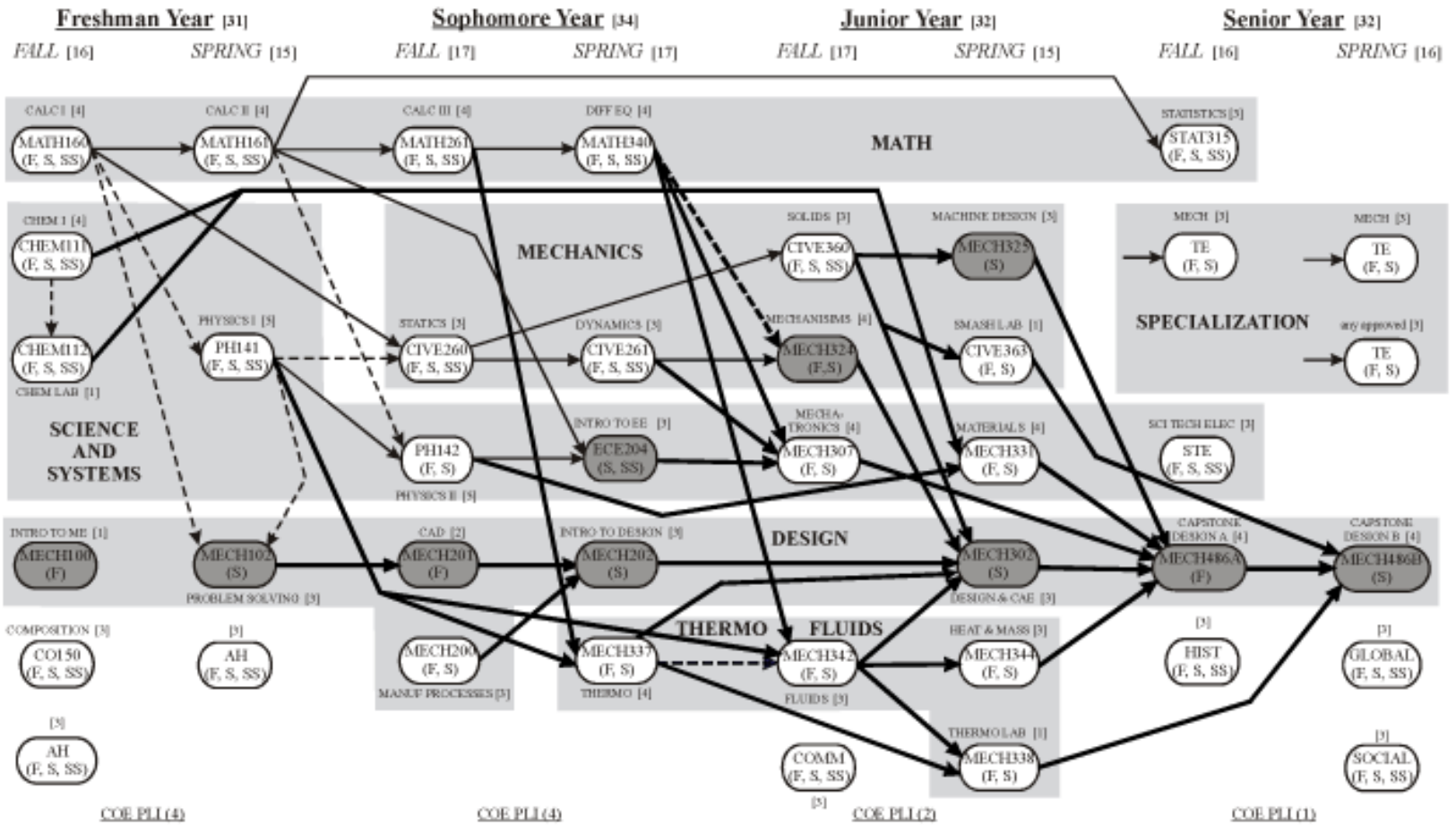
Students will be expected to have a programmable hand-held calculator for use in many of the classes. Students have access to Engineering Network Services (ENS). ENS supports hundreds of computers in the College of Engineering and the Academic Village, with a variety of operating systems, and a large engineering software applications list including programming languages, math applications, office productivity software, physical solid modelers, and other more specialized engineering analysis packages.

Students in the department are required to satisfy the scholastic standards of the university, college, and department. **Please review course prerequisites carefully. Many Mechanical Engineering course prerequisites must be passed with a minimum grade of "C". Students not meeting the minimum grade will be required to retake the prerequisite until the minimum grade is reached.**

Course descriptions and prerequisites can be found at http://www.catalog.colostate.edu/.

MECHANICAL ENGINEERING CURRICULUM FLOW CHART [129 credits]

(7/20/2011)



NOTE: Please review prerequisites carefully. Many MECH course prerequisites must be passed with a minimum grade of "C". Students not meeting the minimum grade will be required to retake the prerequisite(s) until the minimum grade is achieved.

ASME membership recommended

Engineering-related summer job or internship recommended

FE Exam recommended

GRE if interested in graduate school

2.0 Engineering GPA

Track III accelerated Masters recommended if staying at CSU for MS

→ prerequisite - - - ▶ corequisite
(bold arrows indicates minimum C grade requirement)

courses offered only once per academic year

AH: Arts/ Humanities (AUCC 3B)
ASME: American Society of Mech. Engineers
AUCC: All-University Core Curriculum
COMM: Additional Communication (AUCC 2)

COE PLI: College of Engineering Professional Learning Institute Workshop
GLOBAL: Global & Cultural Awareness (AUCC 3E)
HIST: Historical Perspectives (AUCC 3D)
SOCIAL: Social/ Behavior. Sciences (AUCC 3C)

STE: Science Technical Elective (AA 301, AA 302, AA 303, CHEM 113, GEOL 150, LIFE 102, PH 314, NR 130, or NR 150)

TE: Technical Elective

CURRICULUM CHECKSHEET
MECHANICAL ENGINEERING
(7/20/2011)

NAME _____

ADVISER _____

Degree Requirements0—129 credits. Minimum GPAs: 2.0 Engineering GPA, 2.0 cumulative GPA, 2.0 AUCC GPA.

FRESHMAN YEAR (31 credits)		Credits	Grade
CO 150	Composition (SAT vrbl/critcl reading score 600, or ACT English score 26, or CO130) F,S,SS	(3)	
MATH 160	Calculus for Phy.Sci.I (MATH 126; ConReq MATH 124) F,S,SS	(4)	
MATH 161	Calculus for Phy Sci.II (MATH 124, MATH 160) F,S,SS	(4)	
MECH 100	Intro. to Mechanical Engineering (ME Freshmen Only) F	(1)	
MECH 102	Mech. Engr. Problem Solving (ConReg MATH 160, PH 141) S	(3)	
CHEM 111	General Chemistry I (MATH 118 or 160) F, S, SS	(4)	
CHEM 112	General Chemistry Lab I (CHEM 111 or ConReg CHEM 111) F, S, SS	(1)	
PH 141	Physics I – (MATH 126, CoReq MATH 160), F, S, SS	(5)	
CAT.3B-*ARTS & HUMANITIES* F, S, SS (ART, D, E, ETST, HONR, L, MU, PHIL, SPCM, TH)		(3)	
CAT.3B-*ARTS & HUMANITIES* F, S, SS (ART, D, E, ETST, HONR, L, MU, PHIL, SPCM, TH)		(3)	

JUNIOR YEAR (32 credits)		Credits	Grade
CIVE 360	Mechanics of Solids (CIVE 260) F, S, SS	(3)	
CIVE 363	Material Properties (CIVE 360) F, S	(1)	
MECH 302	Engineering Design III (**MECH 202**, **324**, **337**, **342**, **CIVE 360**) S	(3)	
MECH 307	Mechatronics (**CIVE 261**, **ECE 204**, **MATH 340**) F, S	(4)	
MECH 324	Dynamics of Machines (CIVE 261, ConReg **MATH 340** or concurrent MATH 340) F, S	(4)	
MECH 325	Machine Design (**CIVE 360**) S	(3)	
MECH 331	Intro. Engineering Materials (**CHEM 111**, **CHEM 112**, **PH 142**) F, S	(4)	
MECH 338	Thermosciences Laboratory (**MECH 337**, **342**) F, S	(1)	
MECH 342	Mech. & Therm. Of Flow Processes (**MATH 340**, **PH 141**; **MECH 337** or concurrent MECH 337) F,S	(3)	
MECH 344	Heat and Mass Transfer (**MECH 342**) F,S	(3)	
CAT.3A-*ADDITIONAL COMMUNICATION* (CO, JTC) F, S, SS		(3)	

SOPHOMORE YEAR (34 credits)		Credits	Grade
PH 142	Physics II - (PH 141, CoReq MATH 161) F, S	(5)	
MECH 200	Intro. to Manufacturing Processes F, S	(3)	
MECH 201	Engineering Design I (**MECH 102**) F	(2)	
MECH 202	Engineering Design II (**MECH 200**, **201**) S	(3)	
CIVE 260	Engrg.Mechanics: Statics, MATH 160, ConReg.PH 141) F, S, SS	(3)	
CIVE 261	Engrg.Mechanics: Dynamics (CIVE 260) F, S, SS	(3)	
ECE 204	Intro. to Electrical Engineering (MATH 161, PH 142) S, SS	(3)	
MATH 261	Calculus Phy.Sci. III (MATH 161) F, S, SS	(4)	
MATH 340	Intro. Ord. Diff. Equations (MATH 261) F, S, SS	(4)	
MECH 337	Thermodynamics (**MATH 261**, **PH 141**) F, S	(4)	

SENIOR YEAR (32 Credits)		Credits	Grade
MECH 486A	Engineering Design Practicum I (**MECH 302**, **307**, **325**, **331**, **344**) F	(4)	
MECH 486B	Engineering Design Practicum II (**MECH 338**, **486A**, **CIVE 363**) S	(4)	
SCIENCE TECHNICAL ELECTIVE (AA 301, AA 302, AA 303, CHEM 113, GEOL 150, LIFE 102, NR 130, NR 150, PH 314) F, S, SS		(3-5)	
STAT 315	Statistics for Engineers and Scientists (MATH 161) F, S, SS	(3)	
TE – TECHNICAL ELECTIVES (Choose with Adviser)		(9)	
CAT.3D-*HISTORICAL PERSPECTIVES* F, S, SS (AMST, ANTH, ETST, HIST, NR)		(3)	
CAT.3E-*GLOBAL & CULTURAL AWARENESS* F, S, SS (AGRI, AM, ANTH, E, ECON, ETST, HORT, IE, LB, PHIL, POLS, SA, SOC, SOCR)		(3)	
CAT.3C-*SOCIAL/BEHAVIORAL SCI.* F, S, SS (ANTH, AREC, ECON, EDUC, GR, HDFS, HONR, JTC, POLS, PSY, SOC, SOWK)		(3)	

Bold font indicates minimum C grade prerequisite.

TECHNICAL ELECTIVES

Nine credits of technical electives are required to graduate. *At least two courses must be selected from the list of OPEN MECH or RESTRICTED MECH course listings*. A minimum cumulative GPA of 3.0 is required to register for any of the RESTRICTED MECH courses. The third course may be selected from any of the four Technical Elective groups – OPEN MECH, RESTRICTED MECH (if the 3.0 GPA requirement is met), the ALTERNATE group, or the RESTRICTED ALTERNATE group (if the 3.0 GPA requirement is met).

OPEN MECH

Course Prefix	Course Name (*Prerequisites*)	Cr	Term(s)
MECH 407	Laser Applications in Mechanical Engineering *(PH 142)*	3	F
MECH 408	Applied Engr Economy *(MATH 161. Credit not allowed for both ME408 & ME410)*	3	F
MECH 411	Manufacturing Engineering *(CIVE 360, MECH 331)*	3	SP
MECH 417	Control Systems *(MATH 340. MECH 302)*	3	F
MECH 431	Metals and Alloys *(MECH 331)*	3	F
MECH 432#	Engineering of Nanomaterials *(MECH 331)*	3	F
MECH 437	Internal Combustion Engines *(MECH 344)*	3	F
MECH 460	Aeronautics *(MECH 342)*	3	SP
MECH 463	Building Energy Systems *(MECH 344)*	3	SP
MECH 468	Space Propulsion & Power Engineering *(ECE 204, MECH 337, MECH 342)*	3	F
MECH/BIOM 470	Biomedical Engineering *(PH 141; MATH 155 or MATH 160)*	3	F

RESTRICTED MECH (Minimum cumulative GPA of 3.0 is required)

MECH 507#	Laser Diagnostics for Thermosciences *(PH 142)*	3	SP
MECH 509	Manufacturing Quality Design and Control *(MATH 340, STAT 315)*	3	SP
MECH 512	Reliabiltiy Engineering *(MECH 513, STAT 315)*	3	SP
MECH 513	Simulation Modeling and Experimentation *(STAT 315)*	3	F
MECH 514#	Manufacturing & Robotic Systems *(MECH 417)*	3	SP
MECH 520	Finite Element Analysis in Mech Engr *(CIVE 360; MATH 340 or MATH 530)*	3	SP
MECH 523	Vehicle Energy Storage System Dsgn *(MECH 331)*	3	SP
MECH 524	Principles of Dynamics *(MECH 324)*	3	F
MECH 526	Vehicle Dynamics *(MECH 324)*	4	SP
MECH 529#	Advanced Mechanical Systems *(MECH 307)*	3	SP
MECH 530	Advanced Composite Materials *(CIVE 360, MECH 331)*	3	F
MECH 536	Materials Applications in Renewable Energy *(MECH 331)*	3	F
MECH 538	Mechanical Engineering Thermodynamics *(MECH 337)*	3	F
MECH 539	Advanced Fluid Mechanics *(MECH 342 or CIVE 300)*	3	SP
MECH 580A3	Mechanical Engineering Thermodynamics II *(MECH 337; MATH 340)*	3	SP
MECH 551#	Physical Gas Dynamics I *(MECH 342)*	3	F
MECH 552	Applied Computational Fluid Dynamics *(MECH 342 or CIVE 300)*	3	F
MECH 557	Turbomachinery *(MECH 342, MECH 337)*	3	SP
MECH 558	Combustion *(MECH 342)*	3	F
MECH 564*	Fund. of Robot Mechanics & Controls *(MECH 417)*	3	SP
MECH 567#	Broad-Beam Ion Sources *(MATH 340)*	3	SP
MECH/BIOM 525*	Cell and Tissue Engineering *(BC 351 or BMS 300 or BMS 500 or BZ 310 or NB 501)*	3	SP
MECH/BIOM 531#	Materials Engineering *(MECH 331 or MECH 431)*	3	SP
MECH/BIOM 532*	Materials Issues in Mechanical Design *(MECH 331)*	3	F
MECH/BIOM 570	Bioengineering *(MECH 307, MECH 324)*	3	F
MECH/BIOM 573	Structure and Function of Biomaterials *(MECH 331)*	3	SP
BIOM 581A1*	Biofluid Mechanics	3	SP
MECH 575	Solar and Alternative Energies *(MECH 337, 342 and 344)*	3	SP
ENGR 501	Foundations of Systems Engineering *(no prerequisites)*	3	F,SP

ALTERNATE

BMS 300	Principles of Human Anatomy and Physiology *(LIFE 102 or BZ 101 or BZ 110; CHEM 103 or CHEM 107 or CHEM 111)*	4	F,SP,SM
CIVE 367	Structural Analysis *(CIVE 360)*	3	F,SP
CIVE/ENVE 438	Pollution Control Engineering *(CBE 331 or CIVE 300 or MECH 342, CHEM 113)*	4	F,SP
ECE 411	Control Systems *(ECE 312)*	4	F
HES 207	Anatomical Kinesiology *(no prerequisites)*	3	F,SP,SM
MATH 331	Introduction to Mathematical Modeling *(MATH 161 or concurrent registration; MATH 229 or concurrent registration; MATH 369 or concurrent registration)*	3	F
MATH 332	Partial Differential Equations *(MATH 340 or 345)*	3	SP
MATH 369	Linear Algebra *(MATH 161)*	3	F,SP,SM
MGT 305	Fundamentals of Management *(no prerequisites)*	3	F,SP,SM
MGT 340	Entrepreneurship in the Contemporary World *(no prerequisites)*	3	F,SP,SM
MKT 305	Fundamentals of Marketing *(AREC 202 or ECON 101 or ECON 202)*	3	F,SP,SM
PH 353	Optics and Waves (MATH 261, PH 142)	4	F
PH 451	Introductory Quantum Mechanics I *(MATH 340, PH 314)*	3	F

Other 300-level and above courses may be used with written permission of the Associate Department Head for Undergraduate Studies.

RESTRICTED ALTERNATE (Minimum cumulative GPA of 3.0 is required)

CIVE 504	Wind Engineering *(CIVE 300)*	3	F
CIVE 560	Advanced Mechanics of Materials *(CIVE 360)*	3	F
CIVE 562	Fundamentals of Vibrations *(CIVE 261, CIVE 360)*	3	SP
CS 150✧	Interactive Programming with JAVA *(Placement into MATH 117)*	4	F,SP
CS 160✧	Foundations in Programming *(MATH 118 with a C or better)*	4	F,SP,SM
CS 155✧	Introduction to Unix *(no prerequisites)*	1	F,SP,SM
CS 156✧	Introduction to C Programming I *(CS 155, MATH 118)*	1	F,SP,SM
CS 157✧	Introduction to C Programming II *(CS 156, MATH 118)*	1	F,SP,SM

✧ EXTREMELY TIME INTENSIVE – Computer Science enforces their cheating policy.
Course(s) within parenthesis indicate prerequisite(s).
* even years # odd years