



Office of the Chair
University Senate Council
101 Bowman Hall
Lexington, Kentucky 40506-0059
(859) 257-5872
<http://www.uky.edu/USC/>

15 July 2002

TO: Members, University Senate
FROM: University Senate Council
RE: Course/Program Actions: Effective Date: Fall Semester, 2002,
UNLESS OTHERWISE NOTED.

The Senate Council circulates for your approval the following curricular actions. Objections will be accepted from University Senators and faculty members and must be received on or before August 25, 2002. All other requirements for the courses or programs as approved below must be met.

SENATE COUNCIL

COLLEGE OF ENGINEERING

Department of Mechanical Engineering

Change in Undergraduate Program - Bachelor of Science in Mechanical Engineering

1. Proposed change in USP requirements:

Area IV (Cross-disciplinary component): to be filled by 1 supportive elective and 1 ME technical elective

2. For Proposed change in Major or Professional Course requirements: See pages 5-7

Rationale for change: EGR 101 will better prepare students for the field of Mechanical Engineering and provide laboratory instruction and enhance the Freshman experience according to statistics from the College of Engineering and will improve retention rates. Drop ME 105 and add ME 205 and drop ME 406. This means that 2-D graphical instruction (ME105) will be upgraded to 3D Solid Modeling instruction (ME 205). Because at least $\frac{1}{2}$ or more of ME 406 is currently devoted to solid modeling, ME 406 will be dropped; the remaining material in ME 406 (ANSYS instruction) will be shifted to ME 501)

New Course

ME 205 Computer Aided Engineering Graphics (3)
Combines freehand sketching techniques, both orthographic and pictorial, and the use of a solid modeling program to describe and define mechanical objects using current industrial standards. An introduction to basic dimensioning and tolerancing techniques is included.

Course Change

ME 310 Engineering Experimentation I (3)
(Change in description - add topics)

Change to:

ME 310 Engineering Experimentation I (3)
An instrumentation lab to provide the student with an understanding of the characteristics and application of instrumentation related to basic measurements in ME. Design and planning of experiments. Uncertainty analysis. Principles and application of technical writing and information retrieval.
Prereq: CS 221, ME 330, EE 305 and engineering standing.

Drop Courses:

ME 105 Basic Engineering Graphics (2)
ME 406 Computer Aided-Graphics and Design (3)

Department of Civil Engineering:

Change in Undergraduate Program: B.S. Civil Engineering
Implementation Date for Program Changes: Fall, 2003

Note In response to a request from the Department, several implementation dates have been changed.

University Studies Requirements:

Communications Area

From: COM 199 + Department courses
To: COM 252 or 281

Area III (Humanities)

From: HIS 106 and 107
To: HIS 107 + one humanities course

For Major and Professional Course Requirements and discussion of changes: See pp 8-13

Rationale: Changes have been made to strengthen oral communications in small groups or teams (COM 252 and COM 281) and graphic (plan) communication (addition of lab to CE 303). Design offerings will all share a common lab time to enhance multi-disciplinary team interaction

requirement (ABET/EAC). In addition, CE 221 - CE Uncertainty and Risk Analysis has been added to address the probability and statistics requirement of ABET/EAC and provide students with some background in risk assessment that is involved in all civil engineering projects.

New Courses:

- CE 221 Applied Uncertainty and Risk Analysis in Civil Engineering (3)
An introduction to the applications of uncertainty, reliability, decision, and risk analysis in civil engineering. Data collection, systems analysis, and civil engineering design under uncertainty. Probabilistic analysis applied to the various areas of civil engineering: geotechnical, transportation, environmental, materials, structural, hydraulic, and water resources engineering. Civil engineering systems governed by random processes. Applications of mathematics software, Monte Carlo simulation, and time series in civil engineering.
Prereq: MA 114
Implementation: Fall: 2002
- CE 429 Civil Engineering Systems Design (4)
The course is designed to provide the graduating civil engineer with an integration of professional practice issues with planning, design, and construction. Topics to be covered will include: development of teaming, problem solving, and decision-making skills; development of written and oral technical communication skills; procurement of professional services; integration of planning, design, and construction activities; integration of environmental, legal, political, and social issues and concerns into the project process. All activities will be conducted in teams. Lecture, three hours; laboratory three hours per week.
Prereq: To be taken during the student's last semester
Implementation: Fall: 2002

Course Changes:

- CE 303 Introduction to Construction Engineering (3)
(Change in credits, lecture:lab ratio, description and prereq)

Change to:

- CE 303 Introduction to Construction Engineering (4)
The study of the planning, administration, management, and cost of construction projects and an introduction to the methodology utilized in executing specific designs. Emphasis is placed on the organization of construction firms, development of construction documents, interpretation and analysis of engineering plans and specifications, theory of engineering economics, estimating and quantity take-off, contractual and management systems, scheduling, project administration, and inspection of construction operations. Lecture, three hours; laboratory, two hours per week.
Prereq: CE 106 and registration in the College of Engineering.
Implementation: Fall, 2004

CE 341 Fluid Mechanics I (3)
(Change in credits, description, prereq)

Change to:

CE 341 Fluid Mechanics I (4)
Fundamental principles of thermodynamics and fluid flow. Includes fluids at rest, fluids in motion. Continuity, momentum and energy relations, ideal and viscous fluids. Emphasis on incompressible fluids. Description of pumps and open channels.
Prereq: PHY 231 and MA 214 and registration in the College of Engineering.
Implementation: Fall, 2004

CE 421 Civil Engineering Systems Analysis (3)
(Change in number, credits, title, description, and prerequisites)

Change to:

CE 321 Civil Engineering Systems (2)
An introduction to basic principles of engineering problem solving with applications to civil engineering systems. Formulation and solution of inductive and deductive mathematical models using principles of numerical analysis and mathematical programming.
Prereq or concur: CS 221
Implementation: Fall, 2004

CE 471G Soil Mechanics (3)
(Change in credits, lecture:lab ratio and description)

Change to:

CE 471G Soil Mechanics (4)
A study of the strength, deformation and hydraulic properties of soils and their relationship to settlement, stress distribution, earth pressure, bearing capacity and slope stability. Design of footing foundations and retaining walls. Written and oral presentations of student projects will be required. Lecture, three hours; laboratory, three hours per week.
Prereq: EM 302; prereq or concur: GLY 220; and engineering standing or consent of instructor.
Implementation: Fall, 2003

Current ME Curriculum			
Course	Credit Hours	Course	Credit Hours
<u>First Semester</u>		<u>Fifth Semester</u>	
ME 101 Orientation to Mech. Engr.	1.0	ME 321 Engr. Thermodynamics II	3.0
ME 105 Basic Engineering Graphics	2.0	ME 330 Fluid Mechanics	3.0
CHE 105 Gen. College Chem. I	3.0	EM 302 Mech. Of Deformable Solids	3.0
MA 113 Calculus I	4.0	EM 313 Dynamics	3.0
ENG 101 Writing I	3.0	** (mathematics elective)	3.0
University Studies	3.0	University Studies	3.0
Total Credit Hours	16.0	Total Credit Hours	18.0
<u>Second Semester</u>		<u>Sixth Semester</u>	
ME 151 Manufacturing Engineering	3.0	ME 310 Engr. Experimentation I	3.0
CHE 107 Gen. College Chem. II	3.0	ME 344 Mechanical Design	3.0
MA 114 Calculus II	4.0	ME 325 Elements of Heat Transfer	3.0
ENG 102 Writing II	3.0	ME 340 Intro. to Mech. Systems	3.0
University Studies	3.0	ME 406 Computer-Aided Graphics	3.0
Total Credit Hours	16.0	Total Credit Hours	15.0
<u>Third Semester</u>		<u>Seventh Semester</u>	
PHY 231 Gen. Univ. Physics I	4.0	<u>ME 407 Engineering Ethics</u>	1.0
PHY 241 Gen. Univ. Physics Lab	1.0	<u>ME 311 Engr. Experimentation II</u>	3.0
MA 213 Calculus III	4.0	<u>ME 440 Design of Control</u>	3.0
CS 221 First Course in CS for Engrs.	2.0	<u>ME 501 Mech. Des. W/Finite Ele.</u>	3.0
COM 181 Basic Public Speaking	3.0	* (ME Technical Elective)	3.0
University Studies	3.0	* (ME Technical Elective)	3.0
Total Credit Hours	17.0	<u>Total Credit Hours</u>	16.0
<u>Fourth Semester</u>		<u>Eighth Semester</u>	
ME 220 Engr. Thermodynamics I	3.0	ME 408 Safety Engineering	2.0
PHY 232 Gen. Univ. Physics II	4.0	ME 412 Senior Design Project	3.0
PHY 242 Gen. Univ. Physics Lab	1.0	EE 307 Circuit Analysis w/Applic.	4.0
MA 214 Calculus IV	3.0	* (ME Technical Elective)	3.0

EM 221 Statics	3.0	*** (Supportive Elective)	3.0
University Studies	3.0	University Studies	3.0
Total Credit Hours	17.0	Total Credit Hours	18.0
		Total Credit Hours Required for BSMEE	133.0

PROPOSED CURRICULUM

<u>Course</u>	<u>Credit Hours</u>	<u>Course</u>	<u>Credit Hours</u>
<u>First Semester</u>		<u>Fifth Semester</u>	
EGR 101 Intro. to Engineering	4.0	ME 321 Engr. Thermodynamics II	3.0
CHE 105 Gen. College Chem. I	3.0	ME 330 Fluid Mechanics	3.0
MA 113 Calculus I	4.0	EM 302 Mech. Of Deformable Solids	3.0
ENG 101 Writing I	3.0	EM 313 Dynamics	3.0
University Studies*	3.0	EE 305 Elec. Circuits & Electronics	3.0
Total Credit Hours	17.0	Total Credit Hours	15.0
<u>Second Semester</u>		<u>Sixth Semester</u>	
ME 151 Manufacturing Engineering	3.0	ME 310 Engr. Experimentation I	3.0
CHE 107 Gen. College Chem. II	3.0	ME 344 Mechanical Design	3.0
MA 114 Calculus II	4.0	ME 325 Elements of Heat Transfer	3.0
ENG 102 Writing II	3.0	ME 340 Intro. to Mech. Systems	3.0
COM 181 Basic Public Speaking	3.0	** (mathematics elective)	3.0
Total Credit Hours	16.0	Total Credit Hours	15.0
<u>Third Semester</u>		<u>Seventh Semester</u>	
PHY 231 Gen. Univ. Physics I	4.0	ME 407 Engineering Ethics	1.0
PHY 241 Gen. Univ. Physics Lab	1.0	ME 311 Engr. Experimentation II	3.0
MA 213 Calculus III	4.0	ME 440 Design of Control	3.0
CS 221 First Course in CS for Engrs.	2.0	ME 501 Mech. Des. W/Finite Ele.	3.0
ME 205 Comp-Aided Engr. Graphics	3.0	** (ME Technical Elective)	3.0
University Studies*	3.0	** (ME Technical Elective)	3.0
Total Credit Hours	17.0	Total Credit Hours	16.0

<u>Fourth Semester</u>		<u>Eighth Semester</u>	
ME 220 Engr. Thermodynamics I	3.0	<u>ME 408 Safety Engineering</u>	2.0
PHY 232 Gen. Univ. Physics II	4.0	<u>ME 412 Senior Design Project</u>	3.0
PHY 242 Gen. Univ. Physics Lab	1.0	<u>** (ME Technical Elective)</u>	3.0
MA 214 Calculus IV	3.0	<u>*** (Supportive Elective)</u>	3.0
EM 221 Statics	3.0	<u>University Studies*</u>	3.0
University Studies*	3.0	<u>University Studies*</u>	3.0
Total Credit Hours	17.0	<u>Total Credit Hours</u>	17.0
		<u>Total Credit Hours Required for BSMEE</u>	130.0

*To be selected from the University Studies Program areas of Humanities, Social Sciences and Cross-Cultural in consultation with the academic advisor.

**All electives to be selected in consultation with the academic advisor. Mechanical Engineering Technical Electives must be chosen from the list of Technical Electives listed below.

***The supportive elective is to be chosen from any University course, excluding more elementary versions of required courses such as precalculus mathematics or PHY 211.

Technical Electives: Students should select from the list below.

- ME 380 Topics in Mechanical Engineering
- ME 395 Independent Work in Mechanical Engineering
- ME/MFS 503 Lean Manufacturing Principles and Practices
- ME/MFS 505 Modeling of Manufacturing Processes and Machines
- ME/MSE 506 Mechanics of Composite Materials
- ME/MFS 507 Design for Manufacturing
- ME/MFS 512 Manufacturing Systems
- ME 513 Mechanical Vibrations
- ME 530 Gas Dynamics
- ME 531 Fluid Dynamics I
- ME 532 Advanced Strength of Materials
- ME/MSE 556 Introduction to Composite Materials
- ME 560 Engineering Optics
- ME 563 Basic Combustion Phenomena
- ME/BAE 580 Heating, Ventilation and Air-Conditioning
- ME 599 Topics in Mechanical Engineering
- MSE 201 Materials Science
- CE 521 Engineering Economy
- EGR 599 Topics in Engineering

BACHELOR OF SCIENCE IN CIVIL ENGINEERING CURRICULUM

FRESHMAN YEAR					
CE 120	INTRO CIVIL ENGR	1	CE 106	COMP GRAPH & COMM	3
CHE 105	GEN COL CHEM I	3	CHE 107	GEN COL CHEM II	3
ENG 101	WRITING I	3	COM 199	PRE COMM SKILLS	1
MA 113	CALCULUS I	4	ENG 102	WRITING II	3
*US 1	HIS 106 (R, Humanities)	3	MA 114	CALCULUS II	4
*US 2	GEO 130 (R, Cross-Discipl.)	<u>3</u>	*US 3	HIS 107 (R, Humanities)	<u>3</u>
	TOTAL	17		TOTAL	17

SOPHOMORE YEAR					
CE 211	SURVEYING	4	EM 221	STATICS	3
CS 221	FIRST COURSE CS ENGR	2	MA 214	CALCULUS IV	3
MA 213	CALCULUS III	4	ME 220	ENGR THERMODYN	3
PHY 231	GEN UNIV PHY	4	PHY 232	GEN UNIV PHY	4
PHY 241	GEN UNIV PHY LAB	1	PHY 242	GEN UNIV PHY LAB	1
*US 4	ECO 201 (R, Social Science)	<u>3</u>	*US 5	SOCIAL SCIENCE ELEC	<u>3</u>
	TOTAL	18		TOTAL	17

JUNIOR YEAR					
CE 331	TRANSPORTATION ENGR	3	CE 303	INTRO CONSTR ENGR	3
CE 341	FLUID MECHANICS I	3	CE 381	CIVIL ENGR MATERIALS	3
CE 351	INTRO ENVIRON ENGR	3	CE 382	STRUCTURAL MECHS	3
EM 302	MECHS DEF SOLIDS	3	CE 441	FLUID MECHANICS II	3
MNG 303	DEFORM SOLIDS LAB	1	CE 471G	SOIL MECHANICS	<u>3</u>
GLY 220	PRIN OF PHYSICAL GEOL	<u>4</u>			
	TOTAL	17		TOTAL	15

SENIOR YEAR					
CE 401	SEMINAR	1	##	SYSTEM DESIGN ELECT	4
CE 421	CE SYSTEMS	3	**	TECHNICAL ELECTIVE	3
CE 461G	HYDROLOGY	3	**	TECHNICAL ELECTIVE	3
EM 313	DYNAMICS	3	####	SUPPORTIVE ELECTIVE	3
#	STRUCTURES ELECTIVE	3	*US 6	CROSS CULTURAL ELEC	<u>3</u>
**	TECHNICAL ELECTIVE	<u>3</u>			
	TOTAL	16		TOTAL	16

TOTAL HOURS

133

R = Recommended university studies elective

*To be selected from university studies areas in social science (6 credits), humanities (6 credits), cross-cultural (3 credits) and cross-disciplinary (3 credits/one-half the requirement) in consultation with academic advisor.

** The technical electives are to be chosen from any of the courses at the 300 level or above which carry a CE prefix and in which a student is qualified to enroll, exclusive of required courses. EM 531 is also acceptable.

#The structures elective is to be chosen from the following: CE 482 for students not intending to take the structural design elective (CE 589) or CE 486G and CE 487G (one of these will count as a technical elective).

##The system design elective is to be chosen from the following: CE 539, CE 569 or CE 589.

####The supportive elective is to be chosen from any university course excluding more elementary versions of required courses, such as pre-calculus mathematics or PHY 211.

Bachelor of Science in Civil Engineering Curriculum - Proposed					
FRESHMAN YEAR					
		Credit			Credit
First Semester		Hours	Second Semester		Hours
CE 120 - Intro to Civil Engr		1	CE 106 - Intro Comp Graphics		3
CHE 105 - Gen Coll Chem I		3	CHE 107 - Gen Coll Chem II		3
ENG 101 - Writing I		3	ENG 102 - Writing II		3
MA 113 - Calculus I		4	GLY 220 - Physical Geology		4
US: Humanities Elective		3	MA 114 - Calculus II		4
US: Social Science Elective		3			
Semester Hours		17	Semester Hours		17
SOPHOMORE YEAR					
		Credit			Credit
First Semester		Hours	Second Semester		Hours
CE 211 - Surveying		4	CE 221 - CE Uncertainty & Risk Analysis		3
CE 303 - Intro to Constr Engrg**		4	COM 252 or 281 (1)		3
MA 213 - Calculus III		4	EM 221 - Statics		3
PHY 231 - Gen Univ Physics		4	MA 214 - Calculus IV		3
PHY 241 - Gen Univ Physics Lab		1	PHY 232 - Gen Univ Physics		4
			PHY 242 - Gen Univ Physics Lab		1
Semester Hours		17	Semester Hours		17
JUNIOR YEAR					
		Credit			Credit
First Semester		Hours	Second Semester		Hours
CE 331 - Trans Engrg**		3	CE 321 - CE Systems		2
CE 341 - Fluid Mechanics		4	CE 351 - Intro Envr Engrg**		3
CE 381 - CE Materials**		3	CE 382 - Struct Mechanics		3
EM 302 - Mech Def Solids		3	CE 471G - Soil Mechanics**		4
MNG 303 - Mech Def Solids Lab		1	CS 221 - 1st Crse CS Engr		2

Discussion of Changes

Revised Civil Engineering Curriculum
Approved by Civil Engineering Faculty on Wednesday, October 17, 2001

ELIMINATED REQUIRED COURSES

The following courses have been dropped from the current curriculum:

COM 199 - Presentational Communication Skills 1 credit hour

Three credit hours of Engineering Science

ME 220 - Thermodynamics or EM 313 - Dynamics

Replaced with Engineering Science Elective to be chosen from
ME 220 or EM 313

CE 441 - Fluid Mechanics II 3 credit hours

(Will be taught as a technical elective)

COURSE CHANGES

Added one technical design elective to provide greater civil engineering design depth into the curriculum.

CE 303 - Introduction to Construction Engineering has been increased from 3 credit hours to 4 credit hours to accommodate a lab section that will focus on developing and reading construction drawings and specifications. **(Change in existing course proposal has been submitted.)**

CE 321 - CE Systems is a 2 credit hour version of the current CE 421 course with the same title. The reduction in credit hours from 3 to 2 reflects the elimination of engineering probability and statistics from this course into CE 221. **(Change in existing course proposal has been submitted.)**

CE 341 - Fluid Mechanics has been increased from 3 credit hours to 4 credit hours to accommodate some civil engineering thermodynamics and hydraulic engineering material. **(Change in existing course proposal has been submitted.)**

CE 471G - Soil Mechanics has been increased from 3 credit hours to 4 credit hours in order to introduce all civil engineering students to foundation engineering, a topic covered on the Fundamentals in Engineering (FE) Exam. This is a standardized national exam that is taken by almost all civil engineering students prior to graduation and is an important component in the career of civil engineering professionals. **(Change in existing course proposal has been submitted.)**

CE 539¹ - Transportation Systems Design has been decreased from 4 credit hours to 3 credit hours. This reduction is due to the introduction of the required CE 429 - CE Systems Design. One credit hour of the current CE 539 has been moved into CE 429, e.g., scheduling, cost estimating, team work, communications, impact of civil engineering projects on society, etc.

CE 589¹ - Design of Structural Systems has been decreased from 4 credit hours to 3 credit hours. This reduction is due to the introduction of the required CE 429 - CE Systems Design. One credit hour of the current CE 539 has been moved into CE 429, e.g., scheduling, cost estimating, team work, communications, impact of civil engineering projects on society, etc.

NEW COURSES

CE 221 - CE Uncertainty and Risk Analysis is a 3 credit hour course that was added to the curriculum to address the ABET/EAC program requirements for probability and statistics as well as provide civil engineering students with an introduction to risk assessment techniques. Risk is a reality for all civil engineering projects. **(New course proposal has been submitted.)**

CE 429 - Civil Engineering Systems Design (4 credit hours)

A new capstone design course for all civil engineering students that addresses the ABET EC 2000 criteria listed below **(new course proposal has been submitted):**

(c) An ability to design a system, component, or process to meet desired needs.

1. Graduates have design competence.

(d) An ability to function on multi-disciplinary teams.

1. Graduates are able to articulate teamwork principles.
2. Graduates are able to work with a multi-disciplinary team.

(e) An ability to identify, formulate, and solve engineering problems.

1. Graduates are able to solve defined and open-ended engineering problems.

(g) An ability to communicate effectively.

1. Graduates are able to write effectively.
2. Graduates are able to make formal presentations.
3. Graduates are able to communicate graphically.

(h) The broad education necessary to understand the impact of engineering solutions in a global and societal context.

1. Graduates have a background in social science and humanities that provides them with a foundation for understanding the impact of engineering solutions in a global and societal context.

¹ Credit hour changes for CE 539 and CE 589 will be submitted in fall 2003. They are not included in this package in order to transition our current junior and senior students through the existing curriculum, i.e., we are implementing a one-year transition to accommodate current upper level students.

2. CE courses include information on how engineering solutions affect the quality of life and the physical environment.

(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

1. Graduates are able to use computers to solve engineering problems and to evaluate solutions.

In addition, ASCE (American Society of Civil Engineering) has established Program Criteria for Civil and Similarly Named Engineering Programs related to the curriculum. The design specific characteristics that must be found in the educational program include:

1. *Ability to perform civil engineering design by means of design experiences integrated throughout the professional component of the curriculum.*
2. *Understanding of professional practice issues such as: procurement of work; bidding versus quality based selection processes; how the design professionals and the construction professionals interact to construct a project; the importance of professional licensure and continuing education; and/or other professional practice issues.*

7640C