UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

EP.10.26

Office of the Provost and Vice Chancellor
for Academic Affairs

Swanlund Administration Building
601 East John Street
Champaign, IL 61820

November 10, 2009

Abbas Aminmansour, Chair
Senate Committee on Educational Policy
Office of the Senate
228 English Building, MC-461

Dear Professor Aminmansour:

Enclosed is a copy of a proposal from the College of Engineering to revise the BS in Engineering Mechanics.

This proposal has been approved by the College of Engineering Executive Committee. It now requires Senate review.

Sincerely,

Kristi A. Kuntz
Assistant Provost

KAK/dkk

Enclosures

c: I. Adesida
R. Dennis
P. Ferreira
S. Kamin
C. Livingstone
J. Phillips
M. Pleck
M. Rood
C. Tucker

telephone (217) 333-6677 • *fax* (217) 244-5639
url www.provost.illinois.edu

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

College of Engineering

Executive Committee
306 Engineering Hall, MC-266
1308 West Green Street
Urbana, IL 61801

October 28, 2009

Kristi Kuntz
Assistant Provost
217 Swanlund Administration Building
MC-304

Via: Ilesanmi Adesida, Engineering College

Dear Ms. Kuntz:

The College of Engineering Executive Committee has reviewed and approved the following:

Revision to: **B.S. in Engineering Mechanics in the College of Engineering**
Revision to: **B.S. in Mechanical Engineering in the College of Engineering**

Attached is a copy of the request.

Sincerely yours,

Samuel N. Kamin, Secretary
Executive Committee

Approval Recommended:

Ilesanmi Adesida, Dean
College of Engineering

Date 11/2/09

Enclosure
c: Placid Ferreira
Michael Pleck
Mark Rood
James Phillips
Charles Tucker
Robin Dennis

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Senate Educational Policy Committee
Proposal Check Sheet

PROPOSAL TITLE (Same as on proposal): Revision to B.S. in Engineering Mechanics in the College of Engineering

PROPOSAL TYPE (Please select all that apply below):

A. ☒ Program and degree proposals

1. This proposal is for a graduate program or degree

   ☐ Yes ☒ No

2. **Degree** proposal (e.g. B.S.A.E., M.S.C.E.)

   ☐ New degree - - please name new degree name: _____

   ☐ Revision of an existing degree - - please name of the existing degree to be revised: _____

3. **Major** proposal (disciplinary focus e.g. Mathematics, Mechanical Engineering)

   ☐ New major - - please name new major: _____

   ☒ Revision of an existing major - - please indicate the name of the existing major to be revised: Engineering Mechanics

4. **Concentration** proposal (e.g. Financial Planning)

   ☐ New concentration - - please name new concentration: _____

   ☐ Revision of an existing concentration - - please name the existing concentration to be revised: _____

5. **Minor** proposal (e.g. Cinema Studies)

   ☐ New minor - - please name new concentration: _____

   ☐ Revision of an existing minor - - please name the existing concentration to be revised: _____

6. ☐ Proposal for terminating an existing degree, major, concentration or minor

   Please name and nature of the existing degree, major, concentration or minor: _____

7. ☐ Proposal for a multi-institutional degree between Illinois (UIUC) and a foreign institution

   Please name the existing Illinois degree or program: _____

   Please name the partnering institution: _____

B. ☐ **Proposal for renaming existing academic units** (college, school, department, or program)

Please provide the unit's current name: _____

Please provide the unit's proposed new name: _____

C. ☐ **Proposal for re-organizing existing units** (colleges, schools, departments, or programs)

☐ Change in status of an existing and approved unit (e.g. change from a program to department). Please indicate current unit name including status: _____

☐ Transfer an existing unit

Please provide the current unit's name and home: _____

Please provide the new home for the unit: _____

☐ Merge two or more existing units (e.g. merge department A with department B)

Name and college of unit one to be merged: _____

Name and college of unit two to be merged: _____

☐ Terminate an existing unit. Please provide the current unit's name and status: _____

D. ☐ **Other educational policy proposals** (e.g. academic calendar, grading policies, etc.)

Please indicate the nature of the proposal: _____

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Proposal to the Senate Educational Policy Committee

PROPOSAL TITLE:

Revision to B.S. in Engineering Mechanics in the College of Engineering

SPONSOR:

Prof. James W. Phillips
Associate Head for Undergraduate Programs
Department of Mechanical Science and Engineering (MechSE)
333-4388
jwp@illinois.edu

COLLEGE CONTACT:

Prof. Charles L. Tucker III
Associate Dean for Undergraduate Programs (Engineering)
333-2280
ctucker@illinois.edu

BRIEF DESCRIPTION:

The number of hours required for graduation is being reduced by 3 hours from 131 to 128. The reduction is achieved by eliminating a 3-hour senior design elective course.

JUSTIFICATION:

The College of Engineering has requested all its academic departments to reduce the number of hours required for graduation in their respective undergraduate curricula to 128. This change should help the College retain more undergraduate students and allow them to complete their studies in 4 years.

Despite the elimination of the auxiliary 3-hour senior design elective course, the program still retains a sufficient number of hours of technical core courses and a team-oriented capstone design course, as required by the Accreditation Board for Engineering and Technology.

BUDGETARY AND STAFF IMPLICATIONS:

a. Additional staff and dollars needed—None

b. Internal reallocations (e.g., change in class size, teaching loads, student-faculty ratio, etc.)—A slight reduction in class size in advanced technical courses related to engineering design; no change in student–faculty ratio.

c. Effect on course enrollment in other units and explanations of discussions with representatives of those departments—Negligible course enrollment effect, since most Engineering Mechanics students take their senior design elective courses as ME or TAM ones in their home department (MechSE); discussions were advanced in monthly College of Engineering meetings of the Chief Advisors of Engineering-administered curricula.

d. Impact on the University Library—None

e. Impact on computer use, laboratory use, equipment, etc.—A minor reduction in departmental and College computer and laboratory use

DESIRED EFFECTIVE DATE:

Fall 2009

STATEMENT FOR PROGRAMS OF STUDY CATALOG:

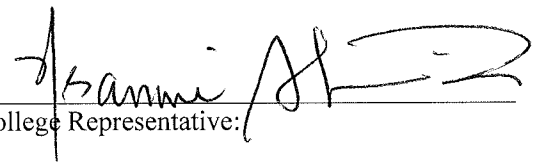
Attached in a separate file is a marked-up copy from the current *Programs of Study Catalog* showing the effect of the curriculum revision on both the Curricular Requirements and the Suggested Sequence.

CLEARANCES:

Signatures:

James W. Phillips
Unit Representative: James W. Phillips

January 13, 2009
Date:


College Representative:

11/2/09
Date:

N/A
Graduate College Representative:

N/A
Date:

Provost Representative:

Date:

Educational Policy Committee Representative:

Date:

Appendix

Statement for *Programs of Study Catalog*

Changes to the current statement are shown as mark-up.

Mechanical Science and Engineering

Mechanical Science and Engineering

Department Head: Huseyin Sehitoglu

Department Office: 144 Mechanical Engineering Building, 1206 West Green, Urbana, (217) 333-1176

Curriculum in Engineering Mechanics

www.mechse.uiuc.edu
Undergraduate Program Office: 154 Mechanical Engineering Building
Fax: (217) 244-6534
E-mail: mechse-undergrad@uiuc.edu

For the Degree of Bachelor of Science in Engineering Mechanics

Engineering mechanics is the discipline devoted to the solution of mechanics problems through integrated application of mathematical, scientific, and engineering principles. Special emphasis is placed on the physical principles underlying modern engineering design.

The program derives its strength from rigorous treatments of statics, dynamics, solid mechanics, fluid mechanics, and mechanics of materials. These topics form the basis of all the mechanical sciences and have wide applicability in modern engineering. Students in engineering mechanics also develop a strong background in mathematics, physics, and chemistry, while specializing in one of several secondary fields within mechanics, such as experimental mechanics.

Special emphasis is placed on advanced dynamics, continuum mechanics, and the rapidly emerging field of computational mechanics. Laboratory experiments in fluid mechanics and mechanics of materials complement an integrated design sequence, starting in the freshman year, which culminates in a team-based design project in one of the professional engineering disciplines, such as aerospace, civil, or mechanical engineering. Students also have the opportunity for independent, creative work in a one-on-one or small group environment under the supervision of a faculty member.

Overview of Curricular Requirements

The curriculum requires ~~131~~ 128 hours for graduation and is organized as shown below.

Technical grade point average requirements for graduation and advanced-level course registration apply to students in this curriculum. These rules are summarized at the College of Engineering's undergraduate advising Web site.

Orientation and Professional Development

These courses introduce the opportunities and resources your college, department, and curriculum can offer you as you work to achieve your career goals. They also provide the skills to work effectively and successfully in the engineering profession.

Hours	Requirements
0	ENG 100—Engineering Orientation[1]
1	TAM 195—Mechanics in the Modern World
1	Total

1. External transfer students take ENG 300—Engrg Transfer Orientation instead.

Foundational Mathematics and Science

These courses stress the basic mathematical and scientific principles upon which the engineering discipline is based.

Hours	Requirements
3	CHEM 102—General Chemistry I
1	CHEM 103—General Chemistry Lab I
3	CHEM 104—General Chemistry II
1	CHEM 105—General Chemistry Lab II
4	MATH 221—Calculus I[1]
3	MATH 231—Calculus II
4	MATH 241—Calculus III
3	MATH 415—Applied Linear Algebra
3	MATH 441—Differential Equations
3	MATH 442—Intro Partial Diff Equations
4	PHYS 211—University Physics: Mechanics
4	PHYS 212—University Physics: Elec & Mag

2	PHYS 213—Univ Physics: Thermal Physics
2	PHYS 214—Univ Physics: Quantum Physics
40	Total

1. MATH 220—Calculus may be substituted, with four of the five credit hours applying toward the degree. MATH 220 is appropriate for students with no background in calculus.

Engineering Mechanics Technical Core

These courses stress fundamental concepts and basic laboratory techniques that comprise the common intellectual understanding of engineering mechanics.

Hours	Requirements
3	CS 101—Intro Computing: Engrg & Sci
3	ECE 205—Elec & Electronic Circuits
3	GE 101—Engineering Graphics & Design
3	ME 300—Thermodynamics
3	TAM 211—Statics
3	TAM 212—Introductory Dynamics
3	TAM 251—Introductory Solid Mechanics
1	TAM 252—Solid Mechanics Design
3	TAM 302—Engineering Design Principles
4	TAM 324—Behavior of Materials
4	TAM 335—Introductory Fluid Mechanics
4	TAM 412—Intermediate Dynamics
4	TAM 445—Continuum Mechanics
3	TAM 470—Computational Mechanics
44	Total

Secondary Field Option Electives

This component of the curriculum enables the student to specialize further by electing a secondary field, a coherent group of technical courses in mechanics and closely related subjects. The current secondary fields are:

- Biomechanics
- Computational Mechanics
- Engineering Science and Applied Mathematics
- Experimental Mechanics
- Fluid Mechanics
- Mechanics of Materials
- Solid Mechanics

Each secondary field generally specifies two required courses and two additional courses from a list of approved elective courses. For each of the secondary fields, the required and approved elective courses specified for them are indicated on the Engineering Mechanics secondary field Web page. To add flexibility to the program and to accommodate particular interests, the student may petition to substitute appropriate courses, including 500-level courses if the student has the adequate preparation, for any of the secondary field elective courses. Without petition, a student may select any one course listed as required in one of the secondary field options to satisfy elective course credits in a chosen secondary field.

Hours	Requirements
12	Secondary field electives selected from departmentally approved courses for Secondary Field Options.

Senior Design Electives

The engineering capstone design course allows the student to apply the knowledge and skills they have learned to a ~~design project in conjunction with a suitably chosen engineering design elective that is directly related to the intended area of focus in that design course~~team-oriented design project.

Hours	Requirements
~~3~~	~~Design elective approved by the departmental design sequence coordinator.~~
3	Capstone design course selected from a departmentally approved list of engineering capstone design courses and approved by the departmental design sequence coordinator.
~~6~~	~~Total~~

Social Sciences and Humanities

The social sciences and humanities courses, as approved by the College of Engineering, ensure that students have exposure in breadth and depth to areas of intellectual activity that are essential to the general education of any college graduate.

Hours	Requirements
18	Electives in social sciences and humanities approved by the College of Engineering and satisfying the campus general education requirements for social sciences and humanities, including cultural studies western and non-western.

Composition

These courses teach fundamentals of expository writing.

Hours	Requirements
4	RHET 105—Principles of Composition
	Advanced Composition (satisfied by completing TAM 324 in the Engineering Mechanics Technical Core)
4	Total

Free Electives

These unrestricted electives give the student the opportunity to explore any intellectual area of unique interest. This freedom plays a critical role in helping students to define research specialties or to complete minors.

Hours	Requirements
6	Free electives. Additional unrestricted course work so that there are at least 128~~131~~ credit hours earned toward the degree.

Suggested Sequence

The schedule that follows is illustrative, showing the typical sequence in which courses would be taken by a student with no college course credit already earned and who intends to graduate in four years. Each individual's case may vary, but the position of required named courses is generally indicative of the order in which they should be taken.

First year

Hours	First Semester
3	CHEM 102—General Chemistry I

1	CHEM 103—General Chemistry Lab I
0	ENG 100—Engineering Orientation
4	MATH 221—Calculus I[1]
4-3	RHET 105—Principles of Composition **or** GE 101—Engineering Graphics & Design[2]
1	TAM 195—Mechanics in the Modern World
3	Elective in social sciences or humanities[3]
16-15	Total

Hours	Second Semester
3	CHEM 104—General Chemistry II
1	CHEM 105—General Chemistry Lab II
3-4	GE 101—Engineering Graphics & Design **or** RHET 105—Principles of Composition[2]
3	MATH 231—Calculus II
4	PHYS 211—University Physics: Mechanics
3	Elective in social sciences or humanities[3]
17-18	Total

Second year

Hours	First Semester
3	CS 101—Intro Computing: Engrg & Sci
4	MATH 241—Calculus III
4	PHYS 212—University Physics: Elec & Mag
3	TAM 211—Statics
3	Elective in social sciences or humanities[3]

17	Total

Hours	Second Semester
3	ECE 205—Elec & Electronic Circuits
2	PHYS 213—Univ Physics: Thermal Physics
2	PHYS 214—Univ Physics: Quantum Physics
3	TAM 212—Introductory Dynamics
3	TAM 251—Introductory Solid Mechanics
1	TAM 252—Solid Mechanics Design
3	Elective in social sciences or humanities[3]
17	Total

Third year

Hours	First Semester
3	MATH 415—Applied Linear Algebra
3	MATH 441—Differential Equations
3	ME 300—Thermodynamics
4	TAM 324—Behavior of Materials
4	TAM 335—Introductory Fluid Mechanics
17	Total

Hours	Second Semester
3	MATH 442—Intro Partial Diff Equations
3	TAM 302—Engineering Design Principles
4	TAM 412—Intermediate Dynamics

4	TAM 445—Continuum Mechanics
~~3~~	~~Elective in social sciences or humanities[3]~~
~~17~~14~~17~~	Total

Fourth year

Hours	First Semester
3	TAM 470—Computational Mechanics
~~3~~	~~Senior design elective[4]~~
3	Secondary field elective[5]
3	Secondary field elective[5]
3	Elective in social sciences or humanities[3]
3	Free elective
15	Total

Hours	Second Semester
3	Senior design elective[4]
3	Secondary field elective[5]
3	Secondary field elective[5]
3	Elective in social sciences or humanities[3]
3	Free elective
15	Total

1. MATH 220—Calculus may be substituted, with four of the five credit hours applying toward the degree. MATH 220 is appropriate for students with no background in calculus.

2. RHET 105 may be taken in the first or second semester of the first year as authorized. The alternative is GE 101.

3. Each student must satisfy the 18-hour social sciences and humanities requirements of the College of Engineering and the campus general education requirements for social sciences and humanities.

4. ~~A design elective or an engineering~~An engineering capstone design course selected from a departmentally approved list of engineering capstone design courses.

~~. Both choices must be approved by the departmental design sequence coordinator. In most cases, the capstone design course is taken in the last semester of study.~~

5. Selected from departmentally approved lists of Secondary Field Electives.

Approved Minutes
College of Engineering Executive Committee (EC) Meeting
Tuesday, 1:00 p.m., September 8, 2009
301 Engineering Hall

Present:

I. Adesida (Admin)	G. Dullerud (MechSE)	D. Jones (ECE)
R. Bhargava (BioE)**	P. Goldbart (PHYS)	M. Rood (CEE)
N. Cheng (MNTL)	B. Heuser (NPRE)	R.S. Sreenivas (IESE)
B. Conway (AE)	P. Kalita (ABE)	C. Tucker (Admin)
Brian Cunningham (BioE)	S. Kamin (CS)	J. Weaver (MatSE)

Absent:

V. Coverstone (Admin)	M. Wong (CSL)	H. Zhao (ChBE)

** = visitor

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1. The meeting was called to order at 1:03.

2. In opening remarks, Dean Adesida suggested that we discuss the COE Leadership Retreat next week. He briefly discussed hiring plans – filling in some strategic areas (e.g. energy, systems engineering), and replacing losses from last year (17 faculty members).

3. Approval of the Draft Minutes from September 1, 2009
The minutes were approved unanimously, with the following corrections, concerning New Business item "Executive Committee Representation on P&T Committee": (1) The members eligible to serve should have been listed as B. Conway, P. Goldbart, and J. Weaver (not including G. Dullerud). (2) The following note should be added: "B. Heuser, R. Bhargava, and S. Kamin abstained from voting on this matter due to a conflict of interest, because their promotion cases may come before P&T in the future."

The final version of the 9/1 minutes should be e-mailed to Ray Price so that he has feedback from EC about his presentation.

4. New Business

a. BioE Campus-wide Graduate Program, Rohit Bhargava
After introducing Brian Cunningham as the new EC representative from BioE, Bhargava gave a presentation, based on one given by Mike Insana to the Administrative Committee, on instituting a new Bioengineering graduate program (BGP). The idea is to create a program that serves and draws resources from the entire campus, reflecting the fact that many BioE students are advised or co-advised by non-BioE faculty. Bhargava briefly reviewed the undergraduate curriculum, and noted that this is a U of I curriculum, there being no universally accepted curriculum in BioE; the core of that curriculum would be built on to form the educational core of the BGP. This new program would be cross-college, with faculty from COE, LAS, ACES, and other colleges serving on a BGP Executive Committee that would define policies and curriculum for the BGP. The faculty who are currently affiliated with BioE, and advise their students, would become more involved in the administration of, and recruiting for, the graduate program. The membership and responsibilities of this committee were discussed. Another part of the plan is to experiment with "modular" courses, where different faculty would teach a module in their area of expertise within a single course (with faculty moving from one course to another). Additional ideas are certificate programs (e.g. for med students from Mayo Clinic), and post-graduate teaching. Summary: this program provides a way for BioE to *innovate* and *grow* at the same time.

The Insana presentation can be found on the secure part of the EC website. BioE approves of dissemination of the presentation to the EC, so that EC members may discuss the proposed program with their departmental faculty.

b. Appointment of a New Member to the Campus General Education Board
Chuck Tucker noted that the Gen Ed board, which controls general education requirements for the campus, has two COE members (D. Goldberg and U. Ravaioli), and needs to nominate a third (to replace outgoing member Susan Lamb). David Lang of CEE has agreed to serve. The EC voted unanimously to endorse this appointment.

5. Course Outlines/Proposals/Reports

a. New/Revised Course Outlines and Program Proposals

— CS 467 "Social Visualization"
The following committee was proposed to review this course: Nigel Goldenfeld (Phys), Michael Loui (ECE, Chair), Brian Bailey (CS). The charge to the committee should include the following inquiries: Is this course proposed at the appropriate level (400), in view of the lack of prerequisites (and the low level of the recommended prerequisites)? Is the grading method proposed, particularly the "20% class participation," appropriate?

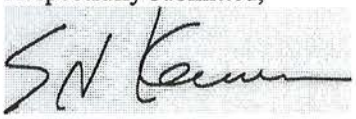
— MechSE "Revision to B.S. in Engineering Mechanics in the College of Engineering"
MechSE "Revision to B.S. in Mechanical Engineering in the College of Engineering"
These two curricula are being revised to reduce graduation requirements to 128 hours.

For the Engineering Mechanics curriculum, the change removes an elective design course associated with the capstone design course. The department says that this will not affect accreditation, nor have other major impacts. The EC chose to consider this change without appointment a subcommittee. The change was approved by unanimous vote.

For the Mechanical Engineering degree, the change reduces the overall science requirement by four hours; specifically, it adds a 4-hour Science Electives requirement and no longer requires CHEM 104+105, PHYS 213, and PHYS 214. The advisability of such a change was debated, after which a motion was made to accept the proposed change. This motion being defeated, it was moved that the proposal be considered by a subcommittee; this motion passed. The following subcommittee was agreed to: Alan Hansen (ABE, Chair), Lance Cooper (Physics), Narayana Aluru (MechSE). The Executive Committee asks the subcommittee to consider the appropriateness of no longer requiring PHYS 213 and PHYS 214, instead making these two courses part of a set of five technical electives where one of the five technical electives is required. The merit of this change should be considered due to the increasing importance in modern engineering sciences of statistical mechanics covered in PHYS 213.

6. The meeting adjourned at 2:25.

Respectfully submitted,



Sam Kamin, Secretary

cc: Becky Osgood
Michael Pleck