

Original

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PROPOSAL SCC #01-02-424c

CURRICULUM PROPOSAL FORM 2001-2002

NON-GENERAL EDUCATION PROCESS A

*DEADLINES: Deadline dates for 2001/2002 submissions: Regular proposals: October 19, 2001 to be implemented in Fall 2002; Short-Term proposals: December 7, 2001 to be implemented in Fall, 2002; Regular proposals February 15, 2002 to be implemented in Spring, 2003; March 22, 2002 for short-term courses to be implemented in Spring 2003.

PROPOSAL TITLE: Course name, minor content, and sequence changes for structural engineering courses in Civil and Environmental Engineering

Structural Engineering III → Analysis and Design of Steel Frames

SPONSOR(S): Douglas B. Cleary and Ralph A. Dusseau

DEPARTMENT: Civil and Environmental Engineering

COLLEGE:

IF LAS CHECK ONE: History/Humanities Math/Sciences Social/Behavioral Sciences

Check one: Undergraduate Graduate

THE ATTACHED **NON-GEN-ED** PROPOSAL IS BEST DESCRIBED BY THE ITEM(S) CHECKED.

New non-gen-ed course

Short-term non-gen-ed course

Minor curricular changes (fewer than three) to:

existing non-gen-ed course

non-gen-ed degree requirements

major

~~minor, specialization, concentration, track, certificate program~~

DEPARTMENT

(Signature indicates approval)

Dept. Curriculum Chair / Date *Joseph D. Elm 2/15/02*

Dept. Chairperson / Date *Kausar Jabbar 2/15/02*

ACADEMIC DEAN

Approved Not Approved Comments: *There are no resource impacts.*

Dean's Signature/Date *Dianne D'Arbo 4/22/02*

COLLEGE CURRICULUM COMMITTEE

Date of open hearing (if necessary) 4/26/02 Approved X Not Approved _____

Comments:

Signature of College Chair/Date: Kevin B. Dahn

UNIVERSITY CURRICULUM COMMITTEE

Date Received/Processed _____

Comments:

Curriculum Chair Signature Louette M. Reeves Date Announced At Senate 6/5/02

EXECUTIVE VICE PRESIDENT/PROVOST

Approved _____ Not Approved _____ If no, reasons are as follows:

Student Credit Hours _____ Faculty Load Hours _____ Equalized Credit Hours _____

Official Copy & Approval Sheet Filed (Date): _____ Executive VP/Provost Signature/Date _____

REGISTRAR

Date Approved Course Description Received _____ Hegis Taxonomy & Course Number Assigned _____

Registrar Signature/Date Edwin C. Engel 7/17/02

NOTIFICATION FORWARD

Senate Curriculum Committee Chairperson

Department Chairpersons

Academic Dean(s)

Registrar

CAD
IRP
7/23/02 MW
Sponsor(s)

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1. Summary and Details of Proposed Changes

- a. Change
- b. Structural Engineering I (0908.281) to Reinforced Concrete Design (0908.481); change Structural Engineering **II** (0908.382) to Structural Analysis and Design (0908.382); and change Structural Engineering **III** (0908.383) to Analysis and Design of Steel Frames (0908.383)
- c. Structural Analysis and Design becomes the first course in the sequence, Analysis and Design of Steel Frames becomes the second course, and Reinforced Concrete Design becomes the third course.
- d. The content of the previous courses and the renamed courses are shown in the table. The content that is new to the sequence is shown in **bold**, while the content that was moved from one of the prior courses to another shown in *italics*.

Current Course	Content
Structural Engineering 1 (0908.281)	Design of reinforced concrete beams including flexure and shear, detailing of reinforcement, design of columns, concrete serviceability requirements, one-way reinforced concrete systems
Structural Engineering 2 (0908.382)	Review of engineering mechanics, design of steel tension and compression members, deflections of trusses by virtual work, force method of truss analysis, stiffness method of truss analysis, design of steel beams, steel tension connections
Structural Engineering 3 (0908.383)	Beam and frame analysis by stiffness method, design of steel beam-columns, design of composite steel/concrete beams, steel frame connections, steel joists and decking, concrete framing systems
Revised Course	Content
Structural Analysis and Design (0908.382)	Review of engineering mechanics, double integration methods, moment area methods, conjugate beam methods , design of steel tension and compression members, deflections of trusses by virtual work, force method of truss analysis
Analysis and Design of Steel Frames (0908.383)	<i>Truss</i> , beam and frame analysis by stiffness method, <i>design of steel beams</i> , steel beam-columns, design of composite steel/concrete beams, <i>steel tension connections</i> , steel frame connections, steel joists and decking
Reinforced Concrete Design (0908.481)	Design of reinforced concrete beams including flexure and shear, detailing of reinforcement, design of columns, concrete serviceability requirements, one-way reinforced concrete systems, <i>concrete framing systems</i>

2. Rational

a. Need

Name changes - These changes are proposed to make the course titles better reflect course content.

Content and sequencing changes – The faculty teaching structural engineering have noted some shortcomings of students entering the sequence following the engineering mechanics courses taught in the sophomore year. The area of greatest concern is the students' abilities to develop shear and moment diagrams. These diagrams are fundamental to most structural design and analysis. To address this problem the double integration, moment area, and conjugate beam methods of analysis are proposed as new topics in the renamed course *Structural Analysis and Design*. These topics are heavily dependent on use of shear and moment diagrams and will therefore reinforce that area. This course is then also presented as the first in the sequence because the topics are most closely tied to the prerequisite courses. The sequence of courses has also been rescheduled to change from the first course being taught in spring of sophomore year to fall of junior year. The added content in *Structural Design and Analysis* force some content to be moved to the renamed *Analysis and Design of Steel Frames*. Steel design is introduced in *Structural Design and Analysis* so *Analysis and Design of Steel Frames* naturally follows as second in the sequence.

The current course Structural Engineering 1 does not share content directly with the other two courses. This course has been offered as the first in the sequence because it was considered the best structures course for environmental engineers. However, this course is also the most difficult. Most environmental students then took one of two dual-level courses, *Advanced Reinforced Concrete* or *Prestressed Concrete* as their second structures course. The advanced courses were taken 3 semesters after completion of their first structures course, putting them at a disadvantage when they took the advanced course. For these reasons *Structural Engineering 1* is renamed *Reinforced Concrete Design* and moved to the last course in the three course sequence

3. Results of Consultations

These proposed changes have no impact on any other department or college on campus. They are strictly confined to changes in names, re-sequencing, and minor reorganization and rearrangement of content within existing courses. No consultations are needed.

4. Appendices

The following pages show the changes and revised catalog descriptions presented for each course.

Proposal for a Minor Change in an Existing Course:

1. Details:

- a) Course Title: Change Structural Engineering III (0908.383) to Analysis and Design of Steel Frames (0908.383)
- b) Sponsor: Civil Engineering Curriculum Committee
- c) Credit Hours: 3 credit hours
- d) Course Level: Junior (current 0908.383)/Junior (future 0908.383)
- e) Curricular Effect: Course currently taken by CEE students on the infrastructure track will now be taken by nearly all CEE students.
- f) Prerequisites: Structural Analysis and Design (0908.382)
- g) Suggested Time/Scale of Implementation: One section fall or spring semester.
- h) Resources:
- | | |
|------------|-------------|
| Faculty: | No changes. |
| Library: | No changes. |
| Equipment: | No changes. |
| Computers: | No changes. |

2. Rationale:

The three proposed minor changes in the existing course called “Structural Engineering III” include: 1) a change in the name of the course to “Design and Analysis of Steel Frames” 2) a change in the catalog description, and 3) minor changes to course content and sequencing. The changes in name and catalog description are proposed to better describe the content of the course as it is currently being taught. There is some slight content change as material previously included in Structural Engineering 2 is moved to this course. The course will now be the second rather than the third course in the sequence of structures courses.

3. Essence of the Course:

a) Objectives:

Upon completion of the course, students will be able to do the following:

- Use the stiffness method to analyze frames

- Analyze and design steel beams
- Analyze and design steel beam-columns
- Design steel framing connections and bracing
- Analyze and design composite steel and concrete beams
- Design floor and roofing systems using metal decking and steel joist girders
- Select appropriate concrete framing systems

b) Topical Outline:

The topical outline of the course may vary to some extent depending on instructor preferences however, topics related to analysis and design of structural framing systems will include:

Stiffness Method for Trusses
 Stiffness Method for Beams
 Stiffness Method for Frames
 Design of Steel Beams
 Design of Steel Beam-Columns
Steel Tension Connections
 Steel Framing Connections
 Design of Frame Bracing Systems
 Composite Steel-Concrete Construction
 Steel Joist Girders and Decking

c) Evaluation and Grading Procedure of Students:

Student grades will be based on individual homework and individual examinations. Some team assignments may be used at the discretion of the instructor (no change to existing).

d) Course Evaluation:

The course will be evaluated based on student evaluations and curriculum review by engineering faculty.

4. Results of Consultations:

None required.

New Catalog Description:

Frame Analysis and Design (0908.383)

Prerequisites: Structural Analysis and Design (0908.382)

This course deals with the analysis and design of structural frames. Analysis using the stiffness method is emphasized. The design of frame members includes the design of steel beams and beam-columns, connections for steel frames, bracing and composite steel/concrete members.

Steel joists and decking are also introduced. The course includes appropriate computer applications.