COLLEGE OF TECHNOLOGY at CANTON

CURRICULAR CHANGE REQUEST Date: 03/20/2009

PART I Please indicate proposed change:

____ Curriculum of Program Change….Name and number_____

_X__ New Course…*Proposed* Name and number _CONS 304-Reinf. Concr. Design___

____ Change in current course……Name and number_____

____ Change in name or number to _____

____ Change in course content and/or credit hours

____ Deletion of course

____ Other curricular item

____ Submit for General Education Approval for _____

School ____Canino School of Engineering Technology_____

Department _Science and Engineering Technology____

Curriculum _Bachelor of Technology in Civil and Environmental Engineering Technology_____

Initiated by __Robert R Blickwedehl___ Proposed Implementation Date __Fall 2011_____

PART II Procedure Checklist: (See Policy & Procedures Manual Section 301.3)

Date	Action By (Signature Required)	Action
___	_____	A. Department Recommendation to School Dean
____	_____	B. Approval by the School Dean
____	_____	C. Consultation with all other Schools (Deans' signatures)
____	_____	
____	_____	
____	_____ (Curriculum Comm. Chair)	D. Curriculum Committee Recommendation Transmitted to Faculty Affairs Committee
____	_____ (Faculty Aff. Chair)	E. Transmitted to Faculty Assembly for Action for Returned to Committee
____	_____ (Presiding Officer)	F. Transmitted to Vice President for Academic Affairs or Returned to Committee
____	_____ (VP Academic Affairs)	G. Notification to College Community

Curricular Change Request must be submitted to the School Dean by November 15 and to the Committee by December 1 for Fall Semester implementation; and to the School Dean by April 15 and to the Committee by May 1 for Spring implementation.

PART III (Respond to each below by number)

1. Statement of Proposed Change (Include course numbers, names, short titles – 25 spaces. Attach course outline, new curriculum worksheet, Gen Ed requirement checklist, and/or other relevant information):

   CONS 304-Reinf. Concr. Design is being added as a new course. Attached is the course outline. This new course is part of a package of courses being added for the new four year bachelors program in Civil and Environmental Engineering Technology.

2. Rationale:

   This course is relevant to the program because it provides the student with a good foundation to work as a structural engineering technologist. The knowledge gained in this course will be applied and expanded upon when the student takes graduate courses in pursuit of his or her professional engineering license[1]. This course is a technical elective in the new four-year bachelors degree that is being proposed in Civil and Environmental Engineering Technology. The course is aimed at students who elect the Structural or Architectural Engineering Technology options.

3. Impact: (Other curricula, staffing, costs, equipment, computer services, library, etc.)

   This change will have no impact on other curricula. There will be an impact on staffing. A new hire will be required to free up an existing faculty member to teach this course or to teach the course. There will be no impacts on computer services or library resources.

4. In what way(s) will this new course (or curriculum) incorporate technology?

   This course involves use of computer technology in all aspects of the course.

PART IV General Education Assessment

1. If submitting a course for GER approval, provide a sample GER assessment plan for the course.

   N/A

STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK

COURSE OUTLINE

CONS 304 - REINFORCED CONCRETE DESIGN

Prepared By: Robert R. Blickwedehl

CANINO SCHOOL OF ENGINEERING TECHNOLOGY
SCIENCE AND ENGINEERING TECHNOLOGY DEPARTMENT
BACHELOR OF TECHNOLOGY IN CIVIL AND ENVIRONMENTAL ENGINEERING TECHNOLOGY
MARCH 2009

CONS 304 - REINFORCED CONCRETE DESIGN

A. **TITLE**: Reinforced Concrete Design

B. **COURSE NUMBER:** CONS 304

C. **CREDIT HOURS:** 4

D. **WRITING INTENSIVE COURSE**: No

E. **COURSE LENGTH:** 15 Weeks

F. **SEMESTER(S) OFFERED:** Spring

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:**
3 lecture hours and one three hour computation lab per week

H. **CATALOG DESCRIPTION:**

In this course, the fundamentals of cast-in-place reinforced concrete design by the strength design method are introduced. Students design slabs, beams, girders, columns and footings in accordance with current version of American Concrete Institute Code 318. Computations are done by manual methods and spreadsheets. Students are introduced to design software. In the lab, students work through the complete design of a small multi-story commercial building.

I. **PRE-REQUISITES/CO-COURSES:**
a. Pre-requisites: CONS 336 (Structural Analysis II)

J. **GOALS (STUDENT LEARNING OUTCOMES):**
By the end of this course, the student will be able to:

1. Analyze and design a reinforced concrete slab
2. Analyze and design reinforced concrete beam (rectangular and tee-beam)
3. Analyze and design a reinforced concrete girder
4. Detail shear reinforcement for beams
5. Detail splices and anchorages for reinforcement
6. Analyze and design a reinforced concrete column
7. Analyze and design a reinforced concrete footing
8. Make a presentation of a completed design

K. **TEXTS:**

Spiegel, L. and Limbrunner, G. (2007) *Reinforced Concrete Design, 6th Edition*. Upper Saddle River, NJ: Prentice Hall.

-- (2008) *318-08[2]: Building Code Requirements for Structural Concrete and Commentary*. American Concrete Institute

L. **REFERENCES:**

M. **EQUIPMENT:** Technology enhanced classroom

[2] Or the year of the code that is in force when the course is implemented

N. **GRADING METHOD:** A-F

O. **MEASUREMENT CRITERIA/METHODS:**

- Exams
- Quizzes
- Lab Design Projects
- Homework
- Design presentation

P. **DETAILED COURSE OUTLINE:**

I. Introduction

A. Concrete and Reinforced Concrete
B. Advantages and Disadvantages of Structural Concrete
C. ACI Code
D. Reinforcing Steel
E. Concrete Mix Materials
F. Dead and Live Loads

II. Fundamental Principles of Bending

A. Behavior of a concrete beam in flexure
B. Analysis of unreinforced beam by the flexure formula
C. The internal couple method of analysis
D. The strength design method for composite material

III. Analysis and Design of Rectangular Reinforced Concrete Beams

A. Balanced, Over-reinforced, and Under-reinforced Beams
B. Criteria for a tension controlled section
C. Detailing requirements
D. Load Factors
E. Strength reduction factors and the maximum practical moment
F. Rectangular Beam Analysis for Moment (Tension Reinforcement only)
G. Rectangular Beam Design for Moment (Tension Reinforcement only)

IV. Slabs

A. Slab nomenclature
B. ACI Criteria for one way slabs
C. Slab analysis
D. Slab design
E. Design of slabs on grade

V. Tee Beams

A. Tee Beam Analysis for Moment (Tension Reinforcement only)
B. Tee Beam Design for Moment (Tension Reinforcement only)
C. Design of compression steel

VI. Girder Design

A. Introduction
B. Calculation of shears and bending moments
C. Girder desing

VII. Design of Shear Reinforcement in Beams

A. Introduction
B. Analysis of beams with no shear reinforcement
C. ACI Code requirements for shear steel
D. Shear Reinforcement Design Procedure
E. Design for torsion

VIII. Development Length - Introduction

A. Development Length - Tension Bars
B. Development Length - Standard Hooks in Tension
C. Development of Web Reinforcement
D. Splices
E. Cutoff of tension bars
F. Additional reinforcing in zones where bars are terminated

IX. Column Design

A. Introduction
B. Strength of Reinforced Concrete Columns - Small Eccentricity
C. Code Requirements Concerning Column Details
D. Analysis of Short Columns - Small Eccentricity
E. Design of Short Columns - Small Eccentricity
F. Summary of Procedure for Analysis and Design of Short Columns with Small Eccentricities
G. Eccentrically loaded columns

X. Footings

A. Introduction
B. Wall Footings
C. Individual Reinforced Concrete Footings for Columns
D. Square Reinforced Concrete Footings
E. Rectangular Reinforced Concrete Footings

Q. LABORATORY OUTLINE:

The laboratory in this course will be devoted to the design of a small reinforced concrete office building. Each of the lab sessions will be devoted to a particular aspect of the project.

1 Shear and bending moment calculations for slabs
2 Shear and bending moment calculations for beams
3 Graphical construction of moment diagrams
4 Design of slabs
5 Design of beams
6 Design of beams (cont.)
7 Design of shear steel for beams
8 Design of girders
9 Design of shear and torsion steel for girders
10 Design of columns
11 Design of footings
12 Design of footings (cont.)
13 Preparation of design drawings and presentation
14 Student design presentations