ROWAN COLLEGE
CURRICULUM COMMITTEE

PROPOSAL TITLE: Prestressed Concrete 0908.554

___UNDERGRADUATE x ___GRADUATE 3 _____CREDIT HOURS

SPONSOR(S): Ralph Alan Dusseau and School of Engineering Curriculum Committee

DEPARTMENT & TELEPHONE# Civil Engineering Program, School of Engineering

CHECK ONE: x COURSE ___MINOR PROGRAM ___CONCENTRATION ___SPECIALIZATION

___ACHIEVEMENT CERTIFICATE ___CERTIFICATION PROGRAM ___MAJOR PROGRAM

STEP #1 (DEPARTMENT)

___APPROVED/DATE: 4-24-96

___NOT APPROVED/DATE:

DEPT. CURRICULUM CHR.

___REVIEWED/DATE: 4-24-96

DEPT. CHR.

STEP #2 (RECEIPT)

SCC# 96-97-17

DATE RECEIVED: SENATE

JUL 9

RECEIVED

SENATE CURRICULUM CHR.

STEP #3 (SCHOOL)

REVIEWED DATE:- 4-18-96

x RECOMMEND TO APPROVE

___RECOMMEND NOT TO APPROVE

FORWARD FOR OPEN HEARING

x WITHOUT RESERVATIONS

___WITH RESERVATIONS

COMMENTS:

SCHOOL COMMITTEE CHR.

STEP #4 (ACADEMIC DEAN)

COMMENTS:

✓ RECOMMEND

___NOT RECOMMEND

___CONDITIONALLY RECOMMEND (SEE COMMENTS)

DATE & SIGNATURE, DEAN OF SCHOOL James M Stacey 5/14/96

STEP #5 (SENATE CURRICULUM COMMITTEE)

DATE OF OPEN HEARING 10-28-96

APPROVED BY SENATE CURRICULUM COMMITTEE (DATE) 10/28/96

___RETURNED TO SPONSOR(S) FOR THE FOLLOWING REASONS:

STEP #6 (SENATE)

...E PRESENTED TO SENATE 11-26-96 x APPROVED ___NOT APPROVED

NOTIFICATION TO EXECUTIVE VICE PRESIDENT/PROVOST (DATE)_____

SENATE CURRICULUM COMMITTEE CHAIR SIGNATURE/DATE Ronald J Gedon 11/26/96

STEP #7 (EXECUTIVE VICE PRESIDENT/PROVOST)

DATE RECEIVED _____

APPROVED: ___YES ___NO

IF NO, REASONS ARE AS FOLLOWS:

STUDENT CREDIT HOURS _____

FACULTY LOAD HOURS _____

EQUALIZED CREDIT HOURS _____

OFFICIAL COPY & APPROVAL SHEET FILED (DATE) 1/31/97

SIGNATURE, EXECUTIVE VICE PRESIDENT/PROVOST C J Matteson

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED 14 Feb 97

HEGIS TAXONOMY AND COURSE NUMBER ASSIGNED 0905.584

DATE/SIGNATURE OF REGISTRAR B J Ketney

NOTIFICATION FORWARD:

___SENATE CURRICULUM COMMITTEE CHAIRPERSON

___DEPARTMENT CHAIRPERSON(S)

___ACADEMIC DEAN(S)

___REGISTRAR

___SPONSOR(S)

Course Proposal:

1. Details:

a)	Course Title:	Prestressed Concrete
b)	Sponsor:	Dr. Ralph Alan Dusseau and School of Engineering Curriculum Committee
c)	Credit Hours:	3 credit hours
d)	Course Level:	Graduate (0908.584)
e)	Curricular Effect:	Elective course for civil engineering graduate students
f)	Prerequisites:	Structural Engineering I or equivalent
g)	Suggested Time/ Scale of Implementation:	One section during fall semesters

h) Resources:

Faculty: Existing faculty can teach this course.

Library: Library acquisitions will be required.

Equipment: No laboratory equipment will be required.

Computers: Computer laboratory access will be required. Acquisition, training, and utilization of professional structural engineering analysis and design software will also be required.

2. Rationale:

The proposed course is an additional civil engineering elective that would supplement the Engineering Curriculum approved by the College Senate in December 1994. The proposed course is consistent with the establishment of the School of Engineering approved by the Board of Trustees in February 1995.

The fundamental theme of the course is the analysis and design of prestressed concrete structural members. Prestressed concrete construction utilizes pretensioned or post-tensioned high-strength steel tendons embedded in high-strength concrete. Applications include highway bridges, parking structures, office

buildings, and industrial buildings. Prestressed concrete is one of the newest, most-efficient, most-flexible, and most-innovative construction options available to the modern structural engineer.

3. Essence of the Course:

a) Objectives:

Upon completion of the course, civil engineering students will be able to analyze and design prestressed concrete structural members by hand calculation and by computer for use in highway bridges, parking structures, office buildings, and industrial buildings including the following tasks:

Selection of the following prestressing materials:

Prestressing steel

Prestressing concrete

Selection of one of the following prestressing methods:

Pretensioning

Post-tensioning

Analysis of prestressed members to determine the adequacy of the following:

Member cross-sectional dimensions

Member cross-sectional properties

Selection of cross-section dimensions and properties for prestressed members with the following:

Parabolic tendon profiles

Straight tendon profiles

Analysis and design of prestressed members for adequate shear capacity including the following:

Shear strength of concrete

Shear strength of steel reinforcing

Analysis of prestressed members to determine the following losses in steel prestress:

Short-term (immediate) losses

Long-term (time-dependent) losses

Design of composite prestressed members including the following components:

Precast prestressed concrete girders

Cast-in-place concrete deck slabs

Calculation of deflection in prestressed members including pretensioned, post-tensioned, and composite members and including the following types of deflection:

Short-term (immediate) deflections

Long-term (time-dependent) deflections

b) Topical Outline:

The topical outline of the course may vary to some extent depending on the interests of the instructor and the students, and on advances in structural engineering technology. The topics to be covered will include the following:

Introduction to the Following:

Prestressing Methods

Prestressing Materials

Flexural Analysis of Prestressed Concrete Beams:

Pretensioning

Post-tensioning

Design of Prestressed Concrete Beams:

Flexural Design Including the Following:

Parabolic Tendon Profiles

Straight Tendon Profiles

Shear Design Including the Following:

Shear Strength of Concrete

Shear Strength of Steel Reinforcing

Partial Loss of Steel Prestressing Including the Following:

Short-Term (Immediate) Losses

Long-Term (Time-Dependent) Losses

Deflection of Prestressed Concrete Beams Including the Following:

Short-Term (Immediate) Deflections

Long-Term (Time-Dependent) Deflections

Design of Composite Prestressed Concrete Beams Including the Following Components:

Precast Prestressed Concrete Girders

Cast-In-Place Concrete Deck Slabs

c) Evaluation and Grading Procedure of Students:

Student grades will be based on midterm and final examinations and homework assignments.

d) Course Evaluation:

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

4. Results of Consultations:

The proposed course is an additional elective that would supplement the Engineering Curriculum approved by the College Senate in December 1994. Consultations were submitted with the original proposal as specified by the Curriculum Committee.

Catalog Description:

Prestressed Concrete (0908.584)

(Prerequisites: Structural Engineering I or equivalent)

The fundamental theme of the course is the analysis and design of prestressed concrete members for highway bridges, parking structures, office buildings, and industrial buildings. Topics covered include prestressed construction applications and materials, flexural analysis of pretensioned and post-tensioning beams, bending and shear design, loss of prestress, deflection, and composite beams. The course includes appropriate computer applications.