

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:** Pavement Analysis and Evaluation

**SPONSOR(S):** Yusuf Mehta, x 5327

**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 Douglas D. Blum 4/24/02

Dept. Chairperson / Date [Signature] 4/24/02

**ACADEMIC DEAN**

Approved  Not Approved  Comments: No increase in resource requirements

Dean's Signature/Date [Signature] 4/24/02

**COLLEGE CURRICULUM COMMITTEE**

Date of open hearing (if necessary) 9/26/02 Approved \_\_\_\_\_ Not Approved \_\_\_\_\_  
Comments:

Signature of College Chair/Date: *Ken O'Sohn*

**UNIVERSITY CURRICULUM COMMITTEE**

Date Received/Processed \_\_\_\_\_  
Comments:

Curriculum Chair Signature *Henette Reeves* Date Announced At Senate 11/5/02

**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 *Susan J. Gles*  
11/23/02

**REGISTRAR**

Date Approved Course Description Received \_\_\_\_\_ Hegis Taxonomy & Course Number Assigned 0908-465

Registrar Signature/Date *E. C. Eigenbrodt Jr* 12/18/02

**NOTIFICATION FORWARD**

Senate Curriculum Committee Chairperson

Academic Dean(s)

Department Chairpersons

Registrar

CAP  
*Sust. Resch*  
*T/m* 1/3/03  
\_\_\_\_ Sponsor(s) *rw*

**Course Proposal:**

**1. Details:**

- a) Course Title: **Pavement Analysis and Evaluation**
- b) Sponsor: Dr. Yusuf A. Mehta, Civil Engineering, x5327
- c) Credit Hours: 3 credit hours
- d) Course Level: Undergraduate, senior-level (0908.462)
- e) Prerequisites: Transportation Engineering (0908.461) or permission of instructor.
- f) Suggested Time: One section during spring semesters, offered alternate years, starting Spring semester, 2003
- g) Curricular Effect: Elective course for civil engineering undergraduate students
- h) Resources
  - Faculty: Existing faculty can teach this course.
  - Library: Library acquisitions will be required.
  - Equipment: Existing laboratory facilities and equipment are adequate for this course.
  - Computers: Computer laboratory access will be required. Acquisition, training, and utilization of professional pavement materials and design software will also be required.
- i) Library Resources: Library acquisitions will be required.

**2. Rationale:**

The proposed course is a new course, derived from an existing course entitled “Advanced Transportation Engineering for Seniors” (0908-462) which is currently part of the undergraduate Engineering Curriculum. The existing course will be changed to “Pavement Analysis and Evaluation,” (0908-462), and offered in odd-numbered years. This new course will cover in greater depth selected aspects of the existing course, and add new topics.

By splitting the single, existing course that is offered every year into two distinct courses offered in alternate years, the variety of technical electives in Civil and Environmental Engineering is broadened.

### 3. Essence of the Course

#### a) Objectives

Upon completion of the course, students will be able to analyze the following phenomenon by field experimentation, computer modeling, and hand calculation:

- Response of layered systems
- Interaction between load and pavement
- Response of discontinuous pavement systems
- Material characterization for response and failure
- Non-linear behavior
- Thermal response
- Pavement performance relationships

#### 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 pavement materials and design technology. The topics initially planned include the following:

Overview of Mechanistic Pavement Design

Pavement Distress and Its Causes

Response of Layered Systems

*Closed form solutions*

*BISAR*

Interaction between load and pavement

*Rigid load (Plate tests)-RIGID*

*FWD Backcalculation-BISDEF*

Measured tire contact stresses

Response of discontinuous pavement systems

*Effect of stiffness gradient, crack length and load position.*

Material Characterization for Response and Failure

*Review of classical fatigue*

*Classical fracture mechanics*

*Continuum damage mechanics*

*Crack growth model*

Non linear behavior

*Source of nonlinearity*

*Effective layer modulus*

*ILLIPAVE*

Thermal response

*Effect of viscoelastic behavior, contraction coefficient, and rate of cooling*

*TCMODEL*

Pavement performance relationships

c) Evaluation and Grading Procedure of Students

Student grades will be based on individual and/or group examinations, individual homework, design projects, and lab reports.

d) Course Evaluation

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

**4. Results of Consultations**

The proposed course is derived from an existing course entitled “Advanced Transportation Engineering for Seniors” (0908-462) which is part of the current Engineering Curriculum approved by the University Senate. Consultations were submitted with the original proposal as specified by the Curriculum Committee.

## **Catalog Description**

Pavement Analysis and Evaluation (0908.465)

Prerequisites: Transportation Engineering (0908.461), or permission of instructor.

(Offered odd-numbered years) The fundamental theme of the course is the engineering study of pavement response. The topics covered include non-linear behavior of pavement materials and interaction between tires and pavements. Modeling and analysis of pavement behavior will also be taught, with content varying based upon instructor and student interests. The course includes field experiments and computer applications.