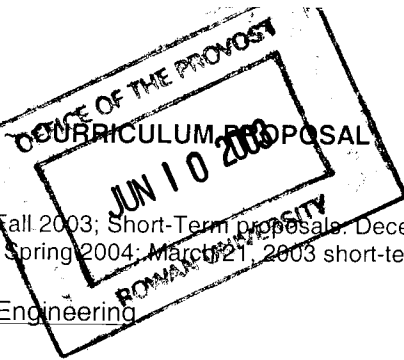


PROCESS A NON-GENERAL EDUCATION



SCC #02-03- 406 (K)

Deadlines:

Regular proposals: October 18, 2002 to be implemented Fall 2003; Short-Term Proposals: December 6, 2002 to be implemented Fall 2003
Regular proposals: February 14, 2003 to be implemented Spring 2004; March 21, 2003 short-term courses to be implemented Spring 2004

PROPOSAL TITLE: Introduction to Crash Safety Engineering

Sponsor(s): Clay Gabler E-Mail: gabler@rowan.edu Ext: 5346
E-Mail: _____ Ext: _____
E-Mail: _____ Ext: _____

DEPARTMENT: Mechanical Engineering

COLLEGE: Engineering

If Liberal Arts & Sciences CHECK : History/Humanities Math/Sciences Social/Behavioral Sciences
 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)
- Existing non-gen-ed course
- Non-gen-ed degree requirements
- Major
- Minor, specialization, concentration, track, certificate program

The following signatures REPRESENT APPROVAL

Department Chair: [Signature] Date: 2/14/03

Department Curriculum Chair: [Signature] Date: 2/14/2003

Academic Dean: [Signature] Date: 2/14/03

College Curriculum Chair: [Signature] Date: 5/12/03

College Curriculum Committee OPEN HEARING Date: 4/11/03 Approved Not Approved

UNIVERSITY CURRICULUM COMMITTEE

Senate Curriculum Chair Signature: [Signature] Date: Senate Announcement/Vote: 6/10/2003

Comments: _____
EXECUTIVE VICE PRESIDENT/PROVOST Signature: [Signature] Date: 6/27/03

Approved ~ Not Approved due to the following: Student Cr Hrs Faculty Load Hrs Equalized Cr Hrs

REGISTRAR

Date: 7/31/03 Course Description Received & Approved ~ Hegis Taxonomy & Course #: 0910.475

Registrar Signature: [Signature] 7/31/03

NOTIFICATION FORWARD

____ SCC Chair Academic Dean Department Chair Registrar Sponsor(s)

Rowan University
LIBRARY RESOURCES
 to

SUPPORT A NEW COURSE or NEW PROGRAM PROPOSAL

The purpose of this form is to provide a channel of communication between the library and faculty designing new courses/programs. The information will be used to assess the resources available in the library, and to identify resources the library should acquire to support the course/program. The information will also provide rationale for institutional support for library acquisitions

This form should be completed in a coordinated effort between the course sponsor(s) and the academic department liaison librarian.

- The sponsor(s) complete parts A & D
If assistance is required to complete parts A & D, please notify the liaison librarian.
- Forward this form to the librarian who will complete parts B, C, & E

This form must be completed and attached to the original curriculum proposal before being approved by the Senate Curriculum Committee

A. College Engineering Department Mechanical Engineering

Proposed by: Clay Gabler Date: April 21, 2003

Course Title: Introduction to Crash Safety Engineering

Anticipated Date for Course/Program Offering: Fall 2004

- B. Describe the resources available in the library to support this course/program, including reference, monographic, electronic databases, audio-visual materials, etc. A summary statement is sufficient.

Campbell Library acquires monographs in all aspects of mechanical engineering through an approval plan that automatically supplies new titles from the major publishers in these fields. Conference proceedings are available upon request through the same plan. Numerous reference volumes will support this course to include: Dictionaries, handbooks, standards, and encyclopedias published by IEEE, McGraw Hill, Wiley, and CRC. Electronic databases that will support the course are: *Science Direct* which includes mechanical engineering journal titles published by Elsevier; Engineering Village which includes Compendex.; General Science Full Text, and the Applied Science and Technology Index. Audio-visual materials have not been systematically acquired in this area, but can be purchased as needed.

- C. List key periodicals available in the library to support this course/program.

Journal of Safety Research
 Transportation Research

- D. List specific resources that should be acquired to support this course.

None

- E. Librarian comments and recommendations:

Monographs, reference works, and journals holdings are adequate to support this course. If other materials should be needed, they will be purchased or acquired through document delivery services.

SCC#02-03-406

NEW COURSE PROPOSAL

Details

a. Course Title:

Introduction to Crash Safety Engineering

b. Sponsor

Clay Gabler, Mechanical Engineering

c. Credit Hours – 3

d. Course Level: Senior Level

e. Prerequisites: Dynamics (0901.291)

f. Suggested Time and Scale of Implementation: To be offered every other year starting Fall 2004.

Curricular Effect

The proposed course will be offered as a senior-level elective for Mechanical Engineering students. Undergraduate mechanical engineering students are required to take four mechanical engineering electives in their senior year. This course will serve as one of these electives. Other engineering students with the required prerequisites may also enroll in this course.

The course was successfully offered in Fall 2002 as a special topics course. Like the special topics course, the proposed course will require no additional staff, space or other resources. The only library resources required for this course, like the special topics course, will be access to the electronic journals already maintained by the Library.

Rationale

In most engineering courses, students develop designs assumed normal operation of a system or device. The proposed course will offer senior-level engineering students the opportunity to design systems (highway vehicles) to protect their users during a catastrophic failure of the system. The course offers a unique perspective on the societal

implications of technological systems and the need to consider design systems with human-machine interaction in mind.

Essence of the Course

a. Objectives

The goal of this course is to present an introduction to the design and analysis of crashworthy cars and light trucks. The course will encompass three major focus areas: the crash response of (1) the vehicle structure, (2) the occupant, and (3) the occupant restraints. Topics will include the analysis of crash tests, vehicle crash kinematics, vehicle modeling, the biomechanics of impact injury, occupant modeling, and airbag design.

b. Topical Outline/Content

1. Introduction

2. Vehicle Impact Response

- Vehicle Crash Kinematics
- Analysis of Crash Tests
- Vehicle Impact Modeling
- Simulation Methods
- Model Extraction Techniques
- The SISAME Code

3. Occupant Impact Response

- Biomechanical Injury Criteria
- Anthropomorphic Crash Test Dummies
- Injury Severity Scales: AIS and alternative metrics
- Occupant Modeling
- The MADYMO Code

3. Occupant Restraint Design

- Restraint Systems
- Airbag Design
- Bag Geometry, Folding, Tethers
- Sensors
- Inflator

4. Advanced Topics

c. Evaluation of students and grading procedure

Students will be evaluated through in-class examinations, completion of problem sets, and in-class presentations.

d. Course evaluation

The success of the course in meeting course goals will be determined through use of in-class examinations, the quality of student presentations, and student evaluations.

Letters of Consultation

The proposed course involves topics of primarily a Mechanical Engineering nature. As there is some reference to human injury tolerance, a letter of consultation is attached from the Department of Biological Sciences.

Catalog Description

Introduction to Crash Safety Engineering (Suggested HEGIS Number 0910.475)

This course presents an introduction to the design and analysis of crashworthy cars and light trucks. The course will encompass three major focus areas: the crash response of (1) the vehicle structure, (2) the occupant, and (3) the occupant restraints. Topics will include the analysis of crash tests, vehicle crash kinematics, vehicle modeling, the biomechanics of impact injury, occupant modeling, and airbag design. Prerequisite: Dynamics (0901.291)

February 20, 2003

Dr. Clay Gabler
Department of Mechanical Engineering
Rowan University

Dear Clay:

Members of my department and I have reviewed your course proposals for Crash Safety Engineering, and we endorse the proposals. The course content is very interesting, and we see no problem with these offerings.

Please do not hesitate to contact me if I can be of further assistance.

Sincerely,

Dr. Patricia Mosto
Chair and Professor
Biology Department
Rowan University
856-256-4834
mosto@rowan.edu



Memorandum

To: Phil Lewis
Chair, University Curriculum Committee

From: H. Clay Gabler
Associate Professor of Mechanical Engineering

RE: New Course Proposals – Crash Safety

Date: April 21, 2003

I have submitted two new course proposals to you on Crash Safety Engineering – Introduction to Crash Safety Engineering and Fundamentals of Crash Safety Engineering. Introduction to Crash Safety Engineering (SC-02-03-406) will be taught as an undergraduate engineering course. Fundamentals of Crash Safety Engineering (SC-02-03-405) will be offered as a graduate engineering course.

Although the courses will share common lecture content, the graduate course, unlike the undergraduate course, has a significant independent study component as described in the course proposal. The graduate course will require that the students research an emerging topic in crash safety chosen in consultation with the instructor, submit a research paper on the student's findings, and present a full-length lecture on this topic to the undergraduate course participants. In the Fall 2002 special topics course on which the proposed course is based, this independent project accounted for 20% of the graduate grade. The independent project lectures were very well received by both undergraduate and graduate students, and will be continued in the proposed course.

February 20, 2003

Dr. Clay Gabler
Department of Mechanical Engineering
Rowan University

Dear Clay:

Members of my department and I have reviewed your course proposals for Crash Safety Engineering, and we endorse the proposals. The course content is very interesting, and we see no problem with these offerings.

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Sincerely,

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