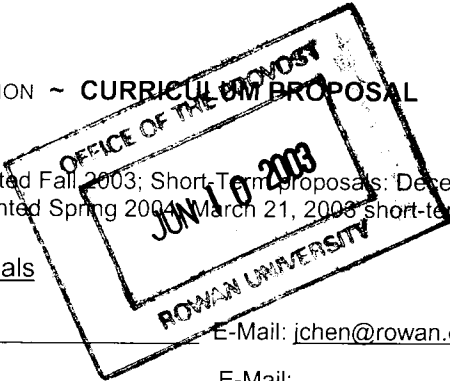


PROCESS A NON-GENERAL EDUCATION ~ CURRICULUM PROPOSAL

SCC #02-03- 4171



Jack/04

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 Biomaterials

Sponsor(s): John C. Chen E-Mail: jchen@rowan.edu Ext: 5346

E-Mail: _____ Ext: _____

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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 Non-gen-ed degree requirements

Short-term non-gen-ed course Major

Minor curricular changes (fewer than three) Minor, specialization, concentration, track, certificate program

Existing non-gen-ed course

The following signatures REPRESENT APPROVAL

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

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

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

College Curriculum Chair: [Signature] Date: 5/2/03

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

UNIVERSITY CURRICULUM COMMITTEE

Senate Curriculum Chair Signature: [Signature] Date: 6/14/2003 Senate Announcement/Vote: 4/10/2003

Comments: _____

EXECUTIVE VICE PRESIDENT/PROVOST Signature: [Signature] Date: 7/1/04

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

REGISTRAR

Date: 7/8/04 Course Description Received & Approved ~ Hegis Taxonomy & Course #: 0910.472

Registrar Signature: [Signature]

NOTIFICATION FORWARD

SCC Chair Academic Dean Department Chair Registrar Sponsor(s)

Trans. 7/22/04 *03/19/04*

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: John C. Chen Date: April 12, 2003

Course Title: Introduction to Biomaterials

Anticipated Date for Course/Program Offering: Spring 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 and biology journal titles published by Elsevier; Engineering Village which includes Compendex.; General Science Full Text, Biosis, 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.

Biomaterials, Dental Materials, Clinical Biomechanics

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

None for now, but perhaps future acquisitions of newly released textbooks will be required.

- 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.

Essence of the Course

a. Objectives

The goal of this course is to present an introduction to the numerous issues that factor into the choice of material selection for biomedical devices. Issues to be examined include mechanical properties, biocompatibility, production costs, and ease of manufacture. This course will familiarize students with relevant material issues and highlight the process for matching material performance with the desired design characteristics and functionality.

Upon successful completion of this course, students will be able to:

1. Apply basic terminology, theory and knowledge of properties of biomaterials.
2. Identify the strengths and weaknesses of a given class of materials regarding their use in medical devices.
3. Select materials for biomedical applications based on design criteria.
4. Identify sources of information on biomaterials and how to use that information.
5. Appreciate the impact of biomaterials on society at large.

b. Topical Outline/Content

1. Introduction
2. Properties of Biological Materials
3. Materials Characterization and Analysis
4. Biocompatibility/Biostability
5. Metals and Alloys
6. Polymers
7. Surface Coatings/Treatments
8. Complementary Design of Medical Devices
9. Biomaterial Applications
 - Cardiovascular Applications
 - Orthopedic and Dental Applications

- Biomaterials in Tissue Engineering

10. Biomaterials Standards and Regulations

c. Evaluation of students and grading procedure

Students will be evaluated through in-class examinations, homework sets, completion of a final project, 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 projects, and student evaluations.

Letters of Consultation

A letter of consultation from the Department of Biological Sciences, Dr. Pat Mosto, Chair, is attached.

SCC#02-03-409

NEW COURSE PROPOSAL

Details

a. Course Title:

Introduction to Biomaterials

b. Sponsor

John C. Chen, Mechanical Engineering

c. Credit Hours – 3

d. Course Level: Senior Level

e. Prerequisites: Materials Science (0901.281)

f. Suggested Time and Scale of Implementation: To be offered every other year, starting Spring 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 proposed course will require no additional staff, space or other resources. The only library resources required for this course will be access to the electronic journals already maintained by the Library.

Rationale

Currently, engineering is experiencing a rapid convergence with human biology, driven mainly by society's needs for better health care, engineering approaches to health care and the growth of the retirement-age population in the US. This course will present an introduction to the important concepts in the application of various materials used in biomedical device applications.

Catalog Description

Introduction to Biomaterials (Suggested HEGIS Number 0910.472)

The goal of this course is to present an introduction to the numerous issues that factor into the choice of material selection for biomedical devices. Issues to be examined include mechanical properties, biocompatibility, production costs, and ease of manufacture. This course will familiarize students with relevant material issues and highlight the process for matching material performance with the desired design characteristics and functionality. Prerequisite: Materials Science (0901.281).

February 26, 2003

Dr. John Chen
Department of Mechanical Engineering
Rowan University

Dear John:

Members of my department and I have reviewed your course proposals for Introduction to Biomechanics, Introduction to Biofluids, and Introduction to Biomaterials, and we strongly endorse these proposals. The courses content is unique, and specifically tailored to engineering students.

In addition, these courses would be interesting electives for Biology students planning careers in the medical profession, or could have some exercises that could be applied to our courses. Some members of the department think that another course that could be added to the list of bio-oriented engineering courses in the future is Functional Morphology (a course about looking at biomechanics in an evolutionary context), which is a very active area of research these days.

The department also sees an opportunity for contributing to any of these courses through guest lectures. The Biology Department strongly supports any effort that engineering is trying to do to bring biology into their curriculum.

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

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Rowan University

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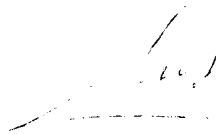
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