

PROCESS A NON-GENERAL EDUCATION CURRICULUM PROPOSAL

SCC #02-03- 4/04



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

fall/04

PROPOSAL TITLE: Introduction to Biomechanics

Sponsor(s): Jennifer Kadlowec E-Mail: kadlowec@rowan.edu Ext: 5344
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: 2/14/03

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

College Curriculum Chair: [Signature] Date: [Signature] 5/10/03

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: 7/7/04

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

Date: 7/8/04 Course Description Received & Approved ~ Hegis Taxonomy & Course #: 0910470

Registrar Signature: [Signature]

NOTIFICATION FORWARD

SCC Chair Academic Dean Department Chair Registrar Sponsor(s)

[Signature] 7-27-04

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: __Jennifer Kadlowec_____ Date: __April 11, 2003_____

Course Title: __Introduction to Biomechanics_____

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.

ASME Journal of Biomechanical Engineering, Journal of Biomechanics
 Clinical Biomechanics

- 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#02-03-404

NEW COURSE PROPOSAL

Details

a. Course Title:

Introduction to Biomechanics

b. Sponsor

Jennifer Kadlowec, Mechanical Engineering

c. Credit Hours – 3 s.h.

d. Course Level: Senior Level

e. Prerequisites: Dynamics (0901.291)

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.

The course is currently being offered in Spring 2003 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 will be access to the electronic databases already maintained by the Library. Online journals may be used to supplement this course.

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 engineering principles to a subfield within the rapidly growing discipline of biomedical engineering. In this course, the students will apply engineering dynamics to study and predict the motion of the human body and review current research topics in this field. The course offers a unique application of engineering dynamics, design and measurement techniques.

Essence of the Course

a. Objectives

The goal of this course is to present an introduction to the biomechanics of human movement. The learning objectives for the students are

- Identify and describe anatomical reference terminology and directional terms
- Use direction cosines for rigid body rotations
- Determine positions, velocities and accelerations using vector kinematics
- Determine and solve dynamic equations of motion for a musculoskeletal system
- Apply muscle models to study/predict human movement
- Review, critique and present research findings for musculoskeletal biomechanics

b. Topical Outline/Content

Kinematics – measurement techniques for motion, acquisition and processing of data, numerical integration/differentiation to determine velocity and acceleration data from displacement

Anthropometry – mass and inertial properties of the human body

Kinetics – relate forces to motion, link-segment models of body

Mechanical energy, work, power and efficiency of the human body

Synthesis of human movement – dynamic equations of motion

Muscle mechanics – force-length and force-velocity characteristics of muscles

c. Evaluation of students and grading procedure

Students will be evaluated through in-class examinations, 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

The proposed course involves only topics of a Mechanical Engineering nature. A letter from Dr. Pat Mosto in Biological Sciences is attached.

Catalog Description

Introduction to Biomechanics (Suggested HEGIS Number 0910.470)

This course presents an introduction to biomechanics of human motion. The course will encompass the use of engineering principles to describe, analyze and assess human movement. Topics will include kinematics, kinetics, anthropometry applied to the synthesis of human movement and muscle mechanics. Prerequisite: Dynamics (0901.291)

February 26, 2003

Dr. John Chen
Department of Mechanical Engineering
Rowan University

Dear John:

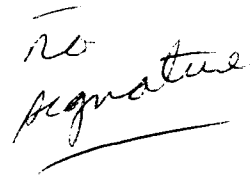
Members of my department and I have reviewed your course proposals for Introduction to Biomechanics, Introduction to Biofluids, and Introduction to Biomaterials, and we strongly endorse these proposals. The courses content is unique, and specifically tailored to engineering students.

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,

A handwritten signature in black ink, appearing to read "Patricia Mosto", with a horizontal line underneath.

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

February 26, 2003

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Department of Mechanical Engineering
Rowan University

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