

Library Resource Form Required for New Non-Gen-Ed

Submission Deadlines: Fall - October 11, 2005 Spring - February 14, 2006

**TITLE** Principles in Biomechanics

Sponsor(s) Jennifer Kadlowec *e-mail: kadlowec@rowan.edu*  
e-mail:  
e-mail:

**DEPARTMENT** Mechanical Engineering  
**College** College of Engineering

If **LAS**-check:  History/Humanities  Social/Behavioral Sciences  
 Math/Science

UNDERGRADUATE  GRADUATE

New non gen-ed  Major

Short-Term non gen-ed

Minor curricular changes (fewer than three) to:

Existing non gen-ed course

Non gen-ed degree requirements

Major

Minor, specialization, concentration, track, certificate program

**Signatures Required: representing approval before submission to Office of the Senate**

Department Chair: *[Signature]* Date: 10/10/2005  
Department CURRICULUM Chair: *[Signature]* Date: 10/10/2005  
Academic DEAN: *[Signature]* Date: 10/10/05

COLLEGE CURRICULUM COMMITTEE: Open Hearing Date: 1/27/05  
Approved:   
Not Approved:

Signature: College Curriculum Chair *[Signature]*

Signature: SENATE CURRICULUM CHAIR *[Signature]*  
Date: 2/27/06

Comments: \_\_\_\_\_

Signature: Executive Vice President/Provost: *[Signature]*  
Date: 3/16/06  
Approved:   
Not Approved:

Signature: REGISTRAR *[Signature]*  
Date: 3/20/06  
Course Description Received & Approved  
Hegis Taxonomy & Course # ME 10570

Notification Forward:

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> SCC CHAIR | <input checked="" type="checkbox"/> Academic Dean      |
| <input checked="" type="checkbox"/> IR        | <input checked="" type="checkbox"/> Department Chair   |
| <input checked="" type="checkbox"/> CAP       | <input checked="" type="checkbox"/> VP/Student Affairs |
| <input checked="" type="checkbox"/> Registrar | <input checked="" type="checkbox"/> Other-             |

*J Mans 3/29/06*

This form **MUST BE COMPLETED FOR NEW COURSE or PROGRAM PROPOSALS, and EXTENSIVE CHANGES TO A COURSE or PROGRAM.**

The purpose of this form is to provide a channel of communication between the Campbell Librarians and faculty when submitting new course or program proposals, or making extensive changes to existing courses or 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 new courses/programs, or extensive changes to same. The information will also provide the 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.

**Note:** Sponsor(s) complete parts A & B

If assistance is required to complete, please notify the librarian liaison.

Forward this form to the librarian who will complete parts C, D & E

**When form is completed, attach to the original curriculum proposal before submitting to the Senate office.**

A. College: Engineering

Department: Mechanical Engineering

Proposed by: Jennifer Kadlowec

Date: October 10, 2005

COURSE TITLE: Principles in Biomechanics

Anticipated Date for Course/Program Offering: Spring 2007

**B. List specific resources that should be acquired to support this course.**

None. The current holdings in the library, both books and journals, are sufficient for this course. Online databases are also available so students can look up and request articles through interlibrary loan.

**C. 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.**

The library has 8 books under the subject heading Biomechanics. Electronic databases available to support this topic include: Medline, Science Direct, Engineering Village, Applied Science and Technology, and the new Biomedical Reference Collection.

**D. List key periodicals available in the library to support this course/program.**

We have access to the American Society of Mechanical Engineers (ASME) journals online, and to the Journal of Applied Biomechanics and the Journal of Applied Physiology in print.

**E. Librarian comments & recommendations:**

The library can support this new course with our current resources.

LIBRARIAN LIAISON: Denise Brush

Signature: Denise R. Brush

# SCC#05-06- NEW COURSE PROPOSAL

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## ***Details***

**a. Course Title:**

Principles in Biomechanics

**b. Sponsor**

Jennifer Kadlowec, Mechanical Engineering

**c. Credit Hours – 3 s.h.**

**d. Course Level:** Graduate Level

**e. Prerequisites:** Dynamics (0901.291) or permission of instructor

**f. Suggested Time and Scale of Implementation:** To be offered every other year starting Spring 2007

## ***Curricular Effect***

The proposed course will be offered as a graduate elective. Graduate students in the College of Engineering are required to take between 9 and 21 credit hours of engineering electives. This course will serve as one of these electives.

The course is currently being offered in Fall 2005 as a special topics course. Like other special topics courses, 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, online journals and paper journals already maintained by the Library.

## ***Rationale***

In most engineering courses, students develop designs assumed normal to operation of a system or device. The proposed course will offer graduate engineering students the opportunity to hone engineering skills into 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, in-class presentations and development of a lab exercise or project.

### **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***

While the proposed course may involve some topics found in courses such as kinesiology, the bulk of the topics of engineering (particularly mechanical) in nature. A letter from Dr. Robert Sterner in Health and Exercise Sciences is attached.

## ***Catalog Description***

### **Principles in Biomechanics (Suggested HEGIS Number 0910.570) 3 sh**

This course presents topics in the 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. A course project and laboratory project will enhance this course. Prerequisite: Dynamics (0901.291)

October 5, 2005

Jennifer Kadlowec  
Department of Mechanical Engineering  
Rowan University

Dear Jennifer:

I have had the opportunity to review the "Principles in Biomechanics" course proposal. The proposed course provides an advanced approach to concepts in biomechanics and kinesiology that are not covered in the Department of Health and Exercise Science's Kinesiology course. I believe that some students within the Athletic Training specialization may be interested in taking this course as an elective. Many of these students have expressed an interest in biomechanics, for which the Department of Health and Exercise Science does not have an equivalent course. I would also enjoy the opportunity to guest lecture in this course as my terminal degree is in Applied Biomechanics. I strongly support this proposal for approval into the engineering graduate curriculum. If you have any questions please do not hesitate to contact me.

Sincerely,

Rob Sterner, PhD, ATC  
Clinical Coordinator of the Athletic Training Education Program  
Department of Health and Exercise Science  
Rowan University  
856-256-4500 ext 3767  
sterner@rowan.edu