

ROWAN COLLEGE  
CURRICULUM COMMITTEE


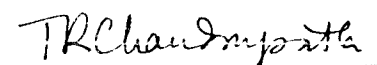
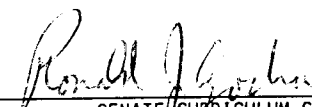

ROPOSAL TITLE: Dynamics 0901-291

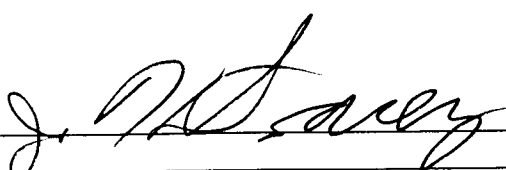
UNDERGRADUATE       GRADUATE       CREDIT HOURS

SPONSOR(S): Tirupathi R. Chandrupatla

DEPARTMENT & TELEPHONE# Mechanical Engineering, 4632

CHECK ONE:  COURSE       MINOR PROGRAM       CONCENTRATION       SPECIALIZATION  
 ACHIEVEMENT CERTIFICATE       CERTIFICATION PROGRAM       MAJOR PROGRAM

STEP #1 (DEPARTMENT)	STEP #2 (RECEIPT)	STEP #3 (SCHOOL)
<input checked="" type="checkbox"/> APPROVED/DATE: <u>12-10-96</u> <input type="checkbox"/> NOT APPROVED/DATE: _____  DEPT. CURRICULUM CHR.  <input checked="" type="checkbox"/> REVIEWED/DATE: _____   DEPT. CHR.	SCC# <u>96-97-87</u>  DATE RECEIVED: <u>12-16-97</u>   SENATE/CURRICULUM CHR.	REVIEWED DATE: <u>12-10-96</u> <input checked="" type="checkbox"/> RECOMMEND TO APPROVE <input type="checkbox"/> RECOMMEND NOT TO APPROVE FORWARD FOR OPEN HEARING <input checked="" type="checkbox"/> WITHOUT RESERVATIONS <input type="checkbox"/> WITH RESERVATIONS COMMENTS:  SCHOOL COMMITTEE CHR.

STEP #4 (ACADEMIC DEAN)	COMMENTS:
<input checked="" type="checkbox"/> RECOMMEND <input type="checkbox"/> NOT RECOMMEND <input type="checkbox"/> CONDITIONALLY RECOMMEND (SEE COMMENTS) DATE & SIGNATURE, DEAN OF SCHOOL _____	 <u>12/10/96</u>

STEP #5 (SENATE CURRICULUM COMMITTEE)
DATE OF OPEN HEARING: _____ APPROVED BY SENATE CURRICULUM COMMITTEE (DATE) <u>1/29/97</u> <input type="checkbox"/> RETURNED TO SPONSOR(S) FOR THE FOLLOWING REASONS: _____ _____

STEP #6 (SENATE)
DATE PRESENTED TO SENATE <u>1/29/97</u> <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> NOT APPROVED NOTIFICATION TO EXECUTIVE VICE PRESIDENT/PROVOST (DATE) _____ SENATE CURRICULUM COMMITTEE CHAIR SIGNATURE/DATE <u>Ronald J. Goheen</u> <u>2/15/97</u>

STEP #7 (EXECUTIVE VICE PRESIDENT/PROVOST)

DATE RECEIVED 3/7/97

APPROVED:  YES  NO

IF NO, REASONS ARE AS FOLLOWS:

STUDENT CREDIT HOURS 2

FACULTY LOAD HOURS 2

EQUALIZED CREDIT HOURS \_\_\_\_\_

OFFICIAL COPY & APPROVAL SHEET FILED (DATE) \_\_\_\_\_

SIGNATURE, EXECUTIVE VICE PRESIDENT/PROVOST [Signature]

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED 14 Mar 97

HEGIS TAXONOMY AND COURSE NUMBER ASSIGNED 0901-291

DATE/SIGNATURE OF REGISTRAR B. Z. Kifer

NOTIFICATION FORWARD:

\_\_\_ SENATE CURRICULUM COMMITTEE CHAIRPERSON

\_\_\_ DEPARTMENT CHAIRPERSON(S)

\_\_\_ ACADEMIC DEAN(S)

\_\_\_ REGISTRAR

\_\_\_ SPONSOR(S)

## Course Proposal

### 1. Details:

- a) **Course Title:** Dynamics
- b) **Sponsor:** Dr. Tirupathi R. Chandrupatla and School of Engineering Curriculum Committee
- c) **Credit Hours:** 2 credit hours
- d) **Course Level:** Sophomore for mechanical and electrical engineering, and Junior for Civil Engineering - Infrastructure option
- e) **Curricular Effect:** Required course for mechanical engineering and electrical engineering majors
- f) **Prerequisites:** Physics I, Statics
- g) **Suggested Time/** Spring 1998  
**Scale of Implementation** Two sections in Spring and one section in Fall.
- h) **Resources:** Faculty will be hired and equipment will be obtained consistent with approved School of Engineering development plans and budget. Computing resources will be required consistent with approved School of Engineering budget. No software beyond what is currently networked will be required. Library resources above and beyond those needed to teach the course may be supplemented by instructors.

### 2. Rationale:

The proposed course is part of the Engineering Curriculum Proposal approved by the College Senate in December 1994. The proposed course is consistent with the establishment of the School of Engineering approved by the Board of Trustees in February 1995.

The proposed course is a core requirement for Mechanical Engineering and Electrical Engineering disciplines. The proposed course meets the Engineering Topics requirement of the Accreditation Board for Engineering and Technology (ABET) for engineering programs.

The fundamentals of motion of particles and rigid bodies which forms the basis for several other engineering courses is introduced in this course. The course is a prerequisite for courses on vibrations, system dynamics and other courses.

### 3. Essence of the Course:

#### a) Objectives:

Upon completion of the course, students will be able to

1. Understand and write equations of motion for particles and rigid bodies and solve them.
2. Understand and formulate a variety of problems in mechanical systems and predict the motion of elements of mechanisms.
3. Understand and use work, energy, impulse and momentum concepts.
4. Apply basic computer software to solve dynamics problems.
5. Conduct simple experiments in rigid body dynamics.

**b) Topical Outline:**

The topics to be covered are listed below. The instructor will supply the students with a syllabus during the first week of classes. The instructor will assess any technology advances in the subject matter prior to the course and make topic changes deemed to be appropriate to maintain the level and currency of instruction.

Introduction to dynamics

- Basic concepts
- Newton's laws
- Formulation and solution of dynamics problems

Kinematics of Particles

- Rectilinear motion
- Plane curvilinear motion
- Rectangular, normal-tangential, and polar coordinates
- Space curvilinear motion
- Relative motion, and constrained motion

Kinetics of particles

- Force, mass, and acceleration
- Equation of motion and solution of problems
- Work, kinetic energy, and potential energy
- Impulse and momentum
- Applications to impact, central force motion, and relative motion
- Systems of particles

Plane kinematics of rigid bodies

- Rotation
- Absolute motion, relative velocity

- Instantaneous center
- Relative acceleration
- Motion relative to rotating axes
- Mass moment of inertia

- Plane kinetics of rigid bodies
  - General equations of motion
  - Translation
  - Fixed axis rotation
  - General plane motion
  - Work-energy relations
  - Acceleration from work-energy; virtual work
  - Impulse-momentum equations

**c) Evaluation and Grading Procedure of Students:**

Student grades will be determined on the basis of examinations, homework and/or projects, laboratory projects and reports. A course syllabus with stated method of arriving at the final grade, e.g., number of exams, projects homework, percentage of grade, will be distributed to the students during the first week of classes.

**d) Course Evaluation:**

The proposed course will be evaluated on the basis of student evaluations and curriculum review by appropriate faculty.

**4. Results of Consultations:**

The proposed course is part of the Engineering Curriculum Proposal approved by the Faculty Senate in December 1994. Consultations were submitted with original proposal as specified by the Curriculum Committee.

**Catalog Description:****Dynamics (0901.291)**

Prerequisites: Physics I, Statics

Study of the kinematics and kinetics of a particle including work-energy, and impulse-momentum methods. Systems of particles are considered. Kinematics and kinetics of plane motion of rigid bodies are introduced with respect to absolute and relative motions in various reference frames. Concept of mass moment of inertia is introduced. Experimental experience will be integrated throughout the course.