ROWAN COLLEGE
CURRICULUM COMMITTEE

ROPOSAL TITLE: Dynamics 09/01/71

x UNDERGRADUATE  ___GRADUATE  ___CREDIT HOURS

SPONSOR(S): Tirupathi R. Chandrupatla

DEPARTMENT & TELEPHONE#: Mechanical Engineering, 4632

CHECK ONE: x COURSE  ___MINOR PROGRAM  ___CONCENTRATION  ___SPECIALIZATION

___ACHIEVEMENT CERTIFICATE  ___CERTIFICATION PROGRAM  ___MAJOR PROGRAM


STEP #1 (DEPARTMENT)

x APPROVED/DATE: 12-10-76

__ NOT APPROVED/DATE:

DEPT. CURRICULUM CHR.

x REVIEWED/DATE:

TR Chandrupatla

DEPT. CHR.

STEP #2 (RECEIPT)

SCE#: G12-47-47

DATE RECEIVED: 12-10-76

STEP #3 (SCHOOL)

REVIEWED DATE: 12-1-76

x RECOMMEND TO APPROVE

__ RECOMMEND NOT TO APPROVE

FORWARD FOR OPEN HEARING

__ WITHOUT RESERVATIONS

WITH RESERVATIONS

COMMENTS:

__ x

__

Ronald J. Gardiner

SENATE/CURRICULUM CHR.

SCHOOL COMMITTEE CHR.


STEP #4 (ACADEMIC DEAN)

x RECOMMEND

__ NOT RECOMMEND

CONDITIONALLY RECOMMEND (SEE COMMENTS)

DATE & SIGNATURE, DEAN OF SCHOOL:

J. Staley

12/10/76


STEP #5 (SENATE CURRICULUM COMMITTEE)

DATE OF OPEN HEARING

APPROVED BY SENATE CURRICULUM COMMITTEE (DATE) 1/24/77

__ RETURNED TO SPONSOR(S) FOR THE FOLLOWING REASONS:


STEP #6 (SENATE)

DATE PRESENTED TO SENATE 1/29/77

x APPROVED  ___ NOT APPROVED

NOTIFICATION TO EXECUTIVE VICE PRESIDENT/PROVOST (DATE)

SENATE CURRICULUM COMMITTEE CHAIR SIGNATURE/DATE:

x

Donald J. Zajac 2/15/77
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

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED 4/11/97

REGIS TAXONOMY AND COURSE NUMBER ASSIGNED 061 291

DATE/SIGNATURE OF REGISTRAR 3/7/97

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/Scale of Implementation: Spring 1998
      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.