

CURRICULUM PROPOSAL FORM

(see #9798-249)

DEADLINES:

REGULAR COURSE PROPOSALS: OCTOBER 23, 1998 FOR FALL, 1999 AND FEBRUARY 19, 1999 FOR SPRING, 2000

SHORT-TERM COURSE PROPOSALS: DECEMBER 11, 1998 FOR FALL, 1999 AND MARCH 26, 1998 FOR SPRING 2000

PROPOSAL TITLE: Mechanical System Dynamics and Control

SPONSOR/S: Jawaharlal Mariappan, Associate Professor, Mechanical Engineering

DEPARTMENT: Mechanical Engineering

0910.343

CHECK ALL THAT APPLY:
 UNDERGRADUATE GRADUATE

COLLEGE: Engineering
If LAS: History/Humanities
 Math/Sciences
 Social/Behavioral Sciences

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TYPE OF PROPOSAL (Check ALL that Apply)

<input type="checkbox"/> General Education	<input checked="" type="checkbox"/> New Course (NOT Gen. Ed.)
<input type="checkbox"/> New Course in <u> </u> Bank	<input type="checkbox"/> Name Change (Dept., School, Major)
<input type="checkbox"/> Existing course, Add To <u> </u> Bank	<input type="checkbox"/> Changes in Degree Requirements
<input type="checkbox"/> Multicultural/Global Designation	<input type="checkbox"/> Changes Involve Gen. Ed. requirements
<input type="checkbox"/> Writing Intensive Designation	<input type="checkbox"/> Minor Changes to Existing Courses
<input type="checkbox"/> New Minor/Concentration/Specialization	<input type="checkbox"/> Course is NOT General Education
<input type="checkbox"/> New Major/Degree Program	<input type="checkbox"/> Course IS General Education
<input type="checkbox"/> Short Term Course Proposal	

DEPARTMENT
 (SIGNATURE INDICATES APPROVAL)

Signature on following page

DEPT. CURRICULUM CHAIR / DATE DEPT. CHAIRPERSON / DATE

COLLEGE CURRICULUM COMMITTEE
 DATE OF OPEN HEARING (if necessary) 11/5/98

APPROVED
 NOT APPROVED

COMMENTS:

Robert P. Heath 11/5/98
 SIGNATURE DATE

ACADEMIC DEAN (& GRADUATE DEAN, for New Graduate Programs Only)

APPROVED
 NOT APPROVED

COMMENTS: *See attached*

 SIGNATURE (Academic Dean) DATE

 SIGNATURE (Graduate Dean) DATE

UNIVERSITY CURRICULUM COMMITTEE

DATE OF OPEN HEARING (if necessary) College level only

APPROVED

NOT APPROVED

COMMENTS:

D. Lewis 11/6/98
SIGNATURE DATE

SENATE

Date announced at Senate 11/6/98

Voted upon at Senate: Approved Not Approved Date:

EXECUTIVE VICE PRESIDENT/PROVOST

APPROVED

NOT APPROVED If no, reasons are as follows:

STUDENT CREDIT HOURS _____ FACULTY LOAD HOURS _____ EQUALIZED CREDIT HOURS _____

OFFICIAL COPY & APPROVAL SHEET FILED (DATE): _____

DATE/SIGNATURE EXECUTIVE VICE PRESIDENT/PROVOST [Signature]

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED 11/9/98

HEGIS TAXONOMY & COURSE NUMBER ASSIGNED 0910.343

DATE/SIGNATURE OF REGISTRAR Robert A. Kulbat 11/9/98

NOTIFICATION FORWARD:

_____ SENATE CURRICULUM COMMITTEE CHAIRPERSON

_____ DEPARTMENT CHAIRPERSONS

_____ ACADEMIC DEAN(S)

_____ REGISTRAR

_____ SPONSOR(S)

ROWAN UNIVERSITY CURRICULUM PROPOSAL

PROPOSAL TITLE: **Mechanical System Dynamics and Control**

CHECK APPROPRIATE: UNDERGRADUATE GRADUATE SEMESTER HOURS

SPONSOR(S): **Jawaharlal Mariappan, Associate Professor, Mechanical Engineering**

DEPARTMENT/TELEPHONE # **Mechanical Engineering, 609-256-4645**

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

<p>Step #1 (Department)</p> <p><input checked="" type="checkbox"/> Approved (Date) <u>2/25/98</u></p> <p><input type="checkbox"/> Not Approved (Date)</p> <p><u>AZ</u> Dept. Curriculum Chr.</p> <p><u>2/26/98</u> Reviewed (Date)</p> <p><u>JR Chandrajith</u> Dept. Chr.</p>	<p>Step #2 (Receipt)</p> <p>SCC# <u>97-98-299</u></p> <p><u>2-27-98</u> Date Received Senate</p> <p>_____ Senate Curriculum Chr.</p>	<p>Step #3 (School)</p> <p>Reviewed Date: <u>2/25/98</u></p> <p><input checked="" type="checkbox"/> Recommend to Approved</p> <p><input type="checkbox"/> Recommend NOT to Approve</p> <p>Forward for Open Hearing:</p> <p><input checked="" type="checkbox"/> WITHOUT Reservations</p> <p><input type="checkbox"/> WITH Reservations:</p> <p>Comments:</p> <p><u>Robert P. Hedekett</u> School Committee Chr.</p>
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Step #4 (Academic Dean): Recommended NOT Recommended Conditionally Recommended (See Comments)

Comments:

Dean Signature/Date Jamaal Dancy 2/27/98

Step #5 (Senate Curriculum Committee): Open Hearing Date: _____ Approved by Curriculum Committee Date _____

Returned to Sponsor(s) for the following reason:

Step #6 (Senate) Date announced/voted on at Senate _____ If voted on: Approved NOT Approved

Date forwarded to Executive Vice President/Provost _____

Senate Curriculum Committee chair Signature/Date: _____

Step #7 (Executive Vice President/Provost): Date Received _____

Approved

NOT Approved If no, reasons are as follows:

Student Credit Hours _____

Faculty Load Hours _____

Equalized Credit Hours _____

Official Copy & Approval Sheet Filed (Date) _____

Executive Vice President/Provost Signature _____

Registrar

Date Approved Course Description Received 11/9/98

Hegis Taxonomy and Course Number Assigned 0910.343

Date/Signature of Registrar Robert A. Kulbat 11/9/98

Notification Forward:

_____ Senate Curriculum Committee Chairperson

_____ Department Chairpersons

_____ Academic Dean(s)

_____ Registrar

_____ Sponsor(s)

Course Proposal

1. Details

- a) Course Title: Mechanical System Dynamics and Control
- b) Sponsor: Dr. Jawaharlal Mariappan and School of Engineering Curriculum Committee
- c) Credit Hours: 3 Credit Hours
- d) Course Level: Junior for Mechanical Engineering (0910.343)
- e) Curricular Effect: Required course for mechanical engineering majors
- f) Prerequisites: Vibrations (0910.201)
- g) Suggested Time: Spring 1999
Scale of Implementation: One section in Spring
- h) Resources: Faculty will be hired and equipment will be obtained consistent with approved School of Engineering development plans and budget. Additional software, hardware, laboratory equipment and apparatus will be required. Library sources 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 disciplines. The proposed course meets the Engineering Topics requirement of the Accreditation Board for Engineering and Technology (ABET) for engineering programs.

System dynamics stems from power and energy exchanges between components, and deals with the mathematical modeling and response. It also forms a sound basis for control systems. Mathematical modeling of systems and design techniques of the control systems using frequency-domain and time-domain methods are essential for all mechanical engineering students.

3. Essence of the Course:

a) Objectives

Upon completion of the course, students will be able to

1. model engineering systems
2. recognize system component characteristics and their interactions
3. perform dynamic analysis of linear and nonlinear systems

4. design control systems using frequency- and time-domain methods
5. model a physical system and develop a control system with realistic system specifications

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 Dynamic-System Models
Classification of Variables and Systems
Mathematical Modeling of Systems
Analysis and Design of Dynamic Systems

Systems
Translational and Rotational (Mechanical)
Electrical and Thermal Systems

Analytical Solution of Linear Models
Developing a Linear Model

Block Diagrams
Bond Graph
State-Space Models
State Equations
The Laplace Transform
Transfer Functions

Feedback Control System Characteristics
Open and Closed Loop Control
Performance Analysis of Feedback Control Systems
Stability of Linear Feedback Systems

Root-Locus Method
Frequency Response Methods

Control System Design
Time Domain
Frequency Domain

c) Evaluation and Grading Procedure of Students:

Student grades will be determined on the basis of examinations, homework, laboratory assignments, projects and reports. A course syllabus with stated method of arriving at the final grade, e.g., number of exams, homework, projects, 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:

0910.343

3 s.h.

Mechanical System Dynamics and Control

Prerequisites: Vibrations (0910.201)

This course introduces the students to system modeling, analysis and control. The first part of the course deals with physical system dynamics. The second part of the course focuses on the design of control systems. Laboratory experience will include computer simulation and analysis of mechanical systems. Students will model a system with realistic specifications and develop a control system.