

ROWAN UNIVERSITY CURRICULUM PROPOSAL

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PROPOSAL TITLE:

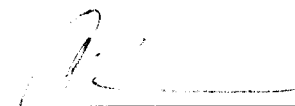

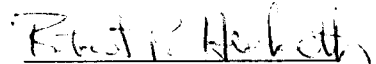
Introduction to Computer Integrated Manufacturing and Automation

CHECK APPROPRIATE: UNDERGRADUATE GRADUATE SEMESTER HOURS

SPONSOR(S): Tirupathi R. Chandrupatla and Dept. of Mechanical Engineering Curriculum Committee

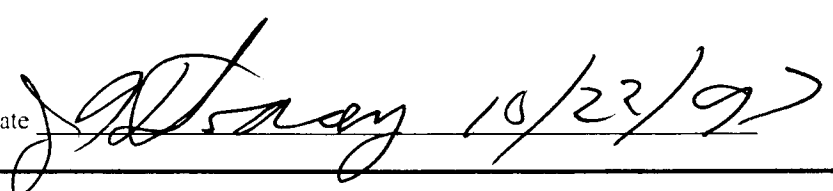
DEPARTMENT/TELEPHONE # 4632

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) 10/22/97 <input type="checkbox"/> Not Approved (Date) <div style="text-align: center;">  Dept. Curriculum Chr. 10/22/97 Reviewed (Date)  Dept. Chr. </div>	SCC# 97-98-84 10-22-97 Date Received Senate <div style="text-align: center;"> _____ Senate Curriculum Chr. </div>	Reviewed Date: 10/22/97 <input checked="" type="checkbox"/> Recommend to Approved <input type="checkbox"/> Recommend NOT to Approve Forward for Open Hearing: <input checked="" type="checkbox"/> WITHOUT Reservations <input type="checkbox"/> WITH Reservations: Comments: <div style="text-align: center;">  School Committee Chr. </div>

Step #4 (Academic Dean): Recommended NOT Recommended Conditionally Recommended (See Comments)

Comments:

Dean Signature/Date:  10/22/97

Step #5 (Senate Curriculum Committee): Open Hearing Date: 12/1/97 Approved by Curriculum Committee Date 12/12/97


Returned to Sponsor(s) for the following reason:

Changes received 1/99

General Changes

Step #6 (Senate) Date announced/voted on at Senate 12/16/97 If voted on: Approved NOT Approved

Forwarded to Executive Vice President/Provost 3-1999

Senate Curriculum Committee chair Signature/Date:  2/28/99

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

Approved

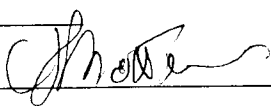
NOT Approved If no, reasons are as follows:

Student Credit Hours 3

Faculty Load Hours 3

Equalized Credit Hours _____


Official Copy & Approval Sheet Filed (Date) _____

Executive Vice President/Provost Signature 

Registrar

Date Approved Course Description Received _____

Hegis Taxonomy and Course Number Assigned

Date/Signature of Registrar 

Notification Forward:

Senate Curriculum Committee Chairperson

Department Chairpersons

Academic Dean(s)

Registrar

Sponsor(s)

TMM 3/31/99

Course Proposal

1. Details:

- a) **Course Title:** Introduction to Computer Integrated Manufacturing and Automation
- b) **Sponsor:** Dr. Tirupathi R. Chandrupatla and College of Engineering Curriculum Committee
- c) **Credit Hours:** 3 credit hours
- d) **Course Level:** Senior (0910.401)
- e) **Curricular Effect:** Elective course for undergraduate students in mechanical engineering
- f) **Prerequisites:** Engineering Materials II (0901.282) or equivalent
- g) **Suggested Time/
Scale of Implementation** One section during fall semesters
- h) **Resources:**
Faculty: Existing faculty can teach this course
Library: No library acquisitions will be required
Equipment: No laboratory equipment will be required
Computers: Computer laboratory access will be required and additional software may be acquired.

2. Rationale:

The proposed course is an additional engineering elective that would supplement 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 course introduces students to the concepts of computer aided design, computer integrated manufacturing and automation. The course covers various applications to industrial manufacturing problems.

3. Essence of the Course:

a) Objectives:

Upon completion of the course, the students will be able to

1. Understand and apply the techniques of flexible manufacturing principles to real manufacturing problems
2. Understand and apply the techniques of manufacturing process optimization.
3. Perform numerical control part programming using available software.

4. Analyze and evaluate robot kinematics, kinetics, and dynamics
5. Understand and apply computer aided process planning techniques and group technology concepts.

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 manufacturing

- Basic concepts
- Manufacturing control
- Design and manufacturing

Part design specification

- Engineering design
- Computer aided design (CAD)
- Dimensioning and tolerancing
- Geometric modeling

Process engineering

- Decision tables and decision trees
- Process capability analysis
- Process optimization

Fixed automation

- Automated manufacture
- Design for automation
- Fixed automated systems
- Hardware
- Economics
- Line balancing

Flexible automation

- Manufacturing strategies
- Lead time considerations for flexible and hard automation
- Trends in flexible automation

Group technology

- Coding and classification
- Classification systems

Process planning

- Manual process planning
- Computer aided process planning (CAPP)
- Variant process planning
- Generative approach

Introduction to numerical control (NC)

- Numerical control hardware
- Interpolation
- Positioning systems
- NC part programming

Industrial robotics

- Classification of robots
- Power sources and actuators
- Sensors and grippers
- Robot applications
- Robot kinematics and dynamics

Artificial intelligence (AI)

- AI and process planning
- AI in manufacturing planning and control

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 an additional elective that would supplement 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:

Introduction to Computer Integrated Manufacturing and Automation (0910.401)

Prerequisites: Engineering Materials II (0901.282) or equivalent

The course covers the basic aspects of computer integrated manufacturing and automation systems. Hard and flexible automation concepts are introduced. Various automation strategies are presented. Coding and classification ideas of group technology are related to computer aided process planning. Topics of numerical control, industrial robotics, and artificial intelligence are discussed.