

ROWAN UNIVERSITY CURRICULUM PROPOSAL

PROPOSAL TITLE:
 Computer Integrated Manufacturing and Automation 09/05/97

CHECK APPROPRIATE: UNDERGRADUATE GRADUATE 3 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) <hr/> <p style="text-align: center;">Dept. Curriculum Chr.</p> <p style="text-align: center;"><u>10/22/97</u> Reviewed (Date)</p> <p style="text-align: center;"><u>T.R. Chandrupatla</u> Dept. Chr.</p>	<p style="text-align: center;">SCC# <u>97-98-83</u></p> <p style="text-align: center;"><u>10-22-97</u></p> <hr/> <p style="text-align: center;">Date Received Senate</p> <hr/> <p style="text-align: center;">Senate Curriculum Chr.</p>	<p style="text-align: right;">Reviewed Date: <u>10/22/97</u></p> <input checked="" type="checkbox"/> Recommend to Approved <input type="checkbox"/> Recommend NOT to Approve <p>Forward for Open Hearing:</p> <input checked="" type="checkbox"/> WITHOUT Reservations <input type="checkbox"/> WITH Reservations: Comments: <p style="text-align: center;"><u>T. R. Chandrupatla</u> School Committee Chr.</p>

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

Comments:

Dean Signature/Date: [Signature] 10/22/97

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 12/10/97 if voted on: Approved NOT Approved

Forwarded to Executive Vice President/Provost _____

Senate Curriculum Committee chair Signature/Date: [Signature] 12/10/97

Step #7 (Executive Vice President/Provost): Date Received: 1/28/98

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 [Signature]

Registrar

Date Approved Course Description Received 28 Jan 98

Hegis Taxonomy and Course Number Assigned 0910-501

Date/Signature of Registrar B. J. Kelsey

Notification Forward:

_____ Senate Curriculum Committee Chairperson

_____ Department Chairpersons

_____ Academic Dean(s)

_____ Registrar

_____ Sponsor(s)

Course Proposal

1. Details:

a) Course Title:	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:	Graduate
e) Curricular Effect:	Elective course for graduate students
f) Prerequisites:	Engineering Materials II 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 graduate 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 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. The course ran under the special topics category in Fall 1996.

Catalog Description:

Computer Integrated Manufacturing and Automation (0910.501)

Prerequisites: Engineering Materials II 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.