

ROWAN COLLEGE
CURRICULUM COMMITTEE

* Minor Change

PROPOSAL TITLE: Engineering Materials II

0901.252-

UNDERGRADUATE

GRADUATE

2 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

<p>STEP #1 (DEPARTMENT)</p> <p><input checked="" type="checkbox"/> APPROVED/DATE: <u>12-10-96</u></p> <p><input type="checkbox"/> NOT APPROVED/DATE: _____</p> <p><u>[Signature]</u> DEPT. CURRICULUM CHR.</p> <p><input checked="" type="checkbox"/> REVIEWED/DATE: _____</p> <p><u>TR Chandrupatla</u> DEPT. CHR.</p>	<p>STEP #2 (RECEIPT)</p> <p>SCC# <u>96-97-90</u></p> <p>DATE RECEIVED: <u>12-16-96</u></p> <p><u>[Signature]</u> SENATE CURRICULUM CHR.</p>	<p>STEP #3 (SCHOOL)</p> <p>REVIEWED DATE:- <u>12-10-96</u></p> <p><input checked="" type="checkbox"/> RECOMMEND TO APPROVE</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>[Signature]</u> SCHOOL COMMITTEE CHR.</p>
---	---	--

STEP #4 (ACADEMIC DEAN) COMMENTS:

RECOMMEND

NOT RECOMMEND

CONDITIONALLY RECOMMEND (SEE COMMENTS)

DATE & SIGNATURE, DEAN OF SCHOOL [Signature] 12/10/96

STEP #5 (SENATE CURRICULUM COMMITTEE)

DATE OF OPEN HEARING _____

APPROVED BY SENATE CURRICULUM COMMITTEE (DATE) 1/29/97

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

NOTE)

TO SENATE 1/29/97

APPROVED

NOT APPROVED

EXECUTIVE VICE PRESIDENT/PROVOST (DATE) _____

COMMITTEE CHAIR SIGNATURE/DATE [Signature] 2/15/97

STEP #7 (EXECUTIVE VICE PRESIDENT/PROVOST)

DATE RECEIVED _____

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 *W. Mott*

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED 14 Mar 97

HEGIS TAXONOMY AND COURSE NUMBER ASSIGNED 0901-282

DATE/SIGNATURE OF REGISTRAR B. Kelly

NOTIFICATION FORWARD:

___ SENATE CURRICULUM COMMITTEE CHAIRPERSON

___ DEPARTMENT CHAIRPERSON(S)

___ ACADEMIC DEAN(S)

___ REGISTRAR

___ SPONSOR(S)

Course Proposal

1. Details:

- a) **Course Title:** Engineering Materials II
b) **Sponsor:** Dr. Tirupathi R. Chandrupatla and School of Engineering Curriculum Committee
c) **Credit Hours:** 2 credit hours
d) **Course Level:** Sophomore for Mechanical Engineering
e) **Curricular Effect:** Required course for mechanical engineering majors
f) **Prerequisites:** Chemistry I, Physics I, Engineering Materials I
g) **Suggested Time/
Scale of Implementation** Spring 1998, Fall 1998
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. 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 discipline. The proposed course meets the Engineering Topics requirement of the Accreditation Board for Engineering and Technology (ABET) for engineering programs.

Knowledge of engineering materials and manufacturing processes for products of various materials are essential for Mechanical Engineering. Material characteristics influence all aspects of engineering design and manufacturing, and other aspects of safety, performance, cost, reliability, and environmental issues.

3. Essence of the Course:

a) Objectives:

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

1. Choose appropriate processes for products made of common engineering materials.
2. Understand the process capabilities and identify design modifications for efficient production.
3. Understand the process needs for manufacturing with various materials.
4. Apply basic computer tools such as spreadsheets etc to solve manufacturing problems for various materials.
5. Conduct simple experiments for manufacturing products of different materials.

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.

Thermal processing of metals and alloys
 Recrystallization and grain growth
 Heat treatments
 Mechanisms of hardening
 Heat treatment of steels
 Precipitation hardening

Fabrication of metals

 Casting

 Casting terminology, Solidification
 Investment casting, Die casting, Other casting methods
 Design for casting

 Powder metallurgy processes

 Powder manufacture
 Mixing and blending, Compacting, Sintering
 Design considerations

 Hot-Working

 Rolling, Forging, Extrusion

 Cold-Working

 Squeezing
 Bending, Shearing, Drawing
 Presses for cold working

- Joining processes
 - Gas welding
 - Arc welding
 - Resistance welding
- Material removal processes
 - Turning, Milling, Drilling
 - Grinding
 - Other operations

- Fabrication of plastics
 - Processes for thermoplastics
 - Processes for thermosetting polymers
 - Processing of rubber and elastomers
 - Joining processes

- Fabrication of ceramics
 - Techniques for glasses
 - Techniques for crystalline ceramics
 - Ceramic tool making

- Fabrication of composite materials

- Non-traditional processes
 - Laser processing
 - Stereolithography
 - Electrochemical and Electrical Discharge Machining

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:**Engineering Materials II (0901.282)**

Prerequisites: Chemistry I, Physics I, Engineering Materials I

This course develops the fabrication processes for engineering materials. Discussion of heat treatment of metals will be followed by manufacturing methods for metals and alloys. Casting, powder metallurgy, hot and cold forming, welding and joining, and material removal techniques for metals will be followed by fabrication techniques for non-metals, ceramics, and composites. Experimental experience will be integrated throughout the course.