

ROWAN COLLEGE CURRICULUM COMMITTEE

* Minor Change

(12)

PROPOSAL TITLE: Engineering Materials I 0901.281

UNDERGRADUATE GRADUATE 2 CREDIT HOURS

SPONSOR(S): C. Stewart Slater and Tirupathi R. Chandrupatla

DEPARTMENT & TELEPHONE# Chemical Engineering, #4631, 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>[Signature]</u> DEPT. CHR.</p>	<p>STEP #2 (RECEIPT)</p> <p>SCC# <u>96-97-89</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: _____

STEP #6 (SENATE)

DATE PRESENTED TO SENATE 1/29/97 APPROVED NOT APPROVED

NOTIFICATION TO EXECUTIVE VICE PRESIDENT/PROVOST (DATE) _____

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

STEP #7 (EXECUTIVE VICE PRESIDENT/PROVOST)

DATE RECEIVED 3/2/97

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 [Signature]

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED 14 Mar 97

HEGIS TAXONOMY AND COURSE NUMBER ASSIGNED 0901-281

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 I
- b) **Sponsor:** Dr. C. Stewart Slater, Dr. Tirupathi R. Chandrupatla, and School of Engineering Curriculum Committee
- c) **Credit Hours:** 2 credit hours
- d) **Course Level:** Sophomore for Mechanical Engineering, and Junior for Civil Engineering, and Chemical Engineering
- e) **Curricular Effect:** Required course for chemical, civil and mechanical engineering majors
- f) **Prerequisites:** Chemistry I, Physics I
- g) **Suggested Time/Scale of Implementation** Spring 1998, Fall 1998
One section in Spring and two sections 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 Chemical Engineering, Civil Engineering, and Mechanical Engineering disciplines. 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 their properties is essential for various branches of engineering including Chemical, Civil, and Mechanical. 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. Understand the importance of engineering materials in various technology areas.
2. Understand material characteristics, structure-property relations, and selection criteria for various engineering materials.
3. Apply the fundamental material concepts to the solution of various engineering problems.
4. Apply basic computer tools such as spreadsheets etc to solve materials problems.
5. Utilize instrumentation to characterize various 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.

Introduction

- Types of materials
- Structure and property relations
- Material selection criteria

Atomic bonding

- Atomic structure, Ionic, Covalent, and Metallic Bonds
- Bonding classification of materials

Crystalline structures

- Lattice structures
- Crystal directions and planes
- Metal structures
- Ceramic structures
- Polymeric structures
- X-ray diffraction

Disorder in solid phases

- Imperfections in crystalline solids
- Dislocations

Noncrystalline materials

Phase Diagrams

Solid solutions

Eutectic and eutectoid diagrams

Quantitative analysis of equilibrated phases

Mechanical properties of materials

Properties of metals and alloys

Properties of ceramics and glasses

Properties of Polymers

Properties of composites

Electronic and magnetic materials

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 I (0901.281)**

Prerequisites: Chemistry I, Physics I

This course develops the material structure and property relations. Atomic bonding, lattice structures, crystalline and polymeric structures and properties, imperfections, dislocations, phase diagrams, and quantitative analysis are presented. Properties of metals and alloys, ceramics, polymers, composites, and electrical materials are discussed. Experimental experience will be integrated throughout the course.