ENGINEERING FACULTY DOCUMENT NO. 1-03
MARCH 15, 2003

TO: FACULTY OF SCHOOLS OF ENGINEERING
FROM: FACULTY OF THE SCHOOL OF NUCLEAR ENGINEERING
DATE: FEBRUARY 28, 2003
SUBJECT: NEW UNDERGRADUATE LEVEL COURSE

The Faculty of the School of Nuclear engineering has approved the new undergraduate course described below. This action is now submitted to the Engineering Faculty with a recommendation for approval.

NUCL 273 **Mechanics of Materials**
Sem. 1, 2 and SS, Class 3, cr. 3.
Prerequisite: ME 270 or consent of instructor.

Analysis of stress and strain; equations of equilibrium and compatibility; stress-strain laws; extension, torsion and bending of bars; membrane theory of pressure vessels; combined loading conditions; transformation of stresses and principal stresses; elastic stability, elected topics.

REASON: This course was offered as CE 273 in the past. It was recently transferred from Civil Engineering to Nuclear Engineering.

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Lefteri H. Tsoukalas
Head, School of Nuclear Engineering

NUCL 273
MECHANICS OF MATERIALS

1. **Justification:** This course integrates principles of mechanics to conduct stress and strain analysis on static elements and structures. It is intended that the student will develop the ability to analyze simple engineering structures using elements of basic mechanics.

2. **Course Level**: Sophmore Engineering Course

3. **Objective**: The objective of this course is that by the end of the semester the student will be able to successfully utilize fundamental mechanics concepts to understand, explain, and describe the behavior of elastic materials in general and the behavior of bars, trusses, beams, and columns subjected to loadings. The student will be able to conduct stress and strain analyses on components subjected to external. The objective will be achieved through lectures and homework.

4. **Pre-requisite**: ME 270 or consent of instructor.

5. **Course Instructor**: Nuclear engineering faculty will teach the course

6. **Course Outline**:

	Topics	*Lectures*
1.	Review of statics	1
2.	Stresses Under Axial Loading	1
3.	Components of Stress-Factor of Safety	3
4.	Stress-Strain Diagram	2
5.	Statically Indeterminate Problems	2
6.	Generalized Hooke's Law	2
7.	Stress Concentrations: Plastic Deformation	2
8.	Stresses in Torsion	2
9.	Angle of Twist: Statically Indeterminate Shafts	2
10.	Stresses in Pure Bending	3
11.	Members Made of Several Materials	1
12.	Eccentric Axial Loading	2
13.	Shear and Moment Diagrams	2
14.	Shearing Stresses in Beams	2
15.	Thin-Walled Members	2
16.	Combined Stresses	2
17.	Transformation of Plane Stress	2
18.	Mohr Circle	2
19.	Principal stresses	1
20.	Yield Criteria	1
21.	Pressure Vessels (Thin-Walled)	1
22.	Deflection by the Integration Method	2
23.	Method of Superposition	2
24.	Euler's Column Formula	2
	Total	44

7. **Textbook**: Beer, F. P., Johnston, E. R. and DeWolff, J.T., "Mechanics of Materials," 3rd Edition, Mc Graw-Hill.