<table>
<tr><td>COURSE NUMBER</td><td>ME 437</td></tr>
<tr><td>COURSE TITLE</td><td>Structural Analysis</td></tr>
<tr><td>COURSE STRUCTURE</td><td>(3-0-3) (lecture hr/wk - lab hr/wk – course credits)</td></tr>
<tr><td>COURSE COORDINATOR</td><td>B. Koplik</td></tr>
<tr><td>COURSE DESCRIPTION</td><td>Stresses and deflections of beams as well as the design of beams, columns, beam-columns and other structural elements. Application of energy methods in structural analysis.</td></tr>
<tr><td>PREREQUISITE(S)</td><td>ME 222 - Ordinary Differential Equations
ME 315 - Stress Analysis</td></tr>
<tr><td>COREQUISITE(S)</td><td>None</td></tr>
<tr><td>REQUIRED, ELECTIVE OR SELECTED ELECT.</td><td>ELECTIVE</td></tr>
<tr><td>REQUIRED MATERIALS</td><td>1. A.C. Ugural and S.K. Fenster, Advanced Mechanics of Materials and Applied Elasticity, 5th Edition, Prentice Hall, 2012.
2. Handouts prepared by instructor on energy methods used in structures.</td></tr>
<tr><td>Other supplemental materials (not Required)</td><td>J.C. McCormac and J.K. Nelson, Structural Analysis, 4th Edition, John Wiley and Sons, 2006.</td></tr>
<tr><td>COMPUTER USAGE</td><td>1. Analysis of elementary structures using various boundary conditions
2. Eigenvalue problems to determine buckling loads.</td></tr>
<tr><td>COURSE LEARNING OUTCOMES/ EXPECTED PERFORMANCE CRITERIA:</td><td>
<table>
<tr><th>Course Learning Outcomes</th><th>SOs*</th><th>Expected Performance Criteria</th></tr>
<tr><td>1 demonstrate an ability to determine stresses and displacements of structures with various loads</td><td>a, e, k</td><td>Exam Question (80% of the students will earn a grade of 75% or better on this question)</td></tr>
<tr><td>2. develop the techniques used in several “energy methods” to analyze structures</td><td>a, e, k</td><td>Final Exam Question (80% of the students will earn a grade of 75% or better on this question)</td></tr>
<tr><td>3. apply computer methods to solve structural problems</td><td>a, e, k</td><td>Homework Problem (80% of the students will earn a grade of 75% or better on this problem)</td></tr>
<tr><td>4. relate analytical solutions to practical real-life structural members</td><td>a, c, e, k</td><td>Homework Problem (80% of the students will earn a grade of 75% or better on this problem)</td></tr>
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CLASS TOPICS	1. Axial, torsion, bending and combined stresses. 2. Beam-column deflections and stresses. 3. Elastic stability for determinate and indeterminate structures. 4. Use of Conservation of Energy in structural analysis. 5. Application of the Principle of Minimum Potential Energy and the Principle of Minimum Complementary Energy in elementary structures. 6. Buckling with members of variable geometry and material properties. 7. Beams on elastic foundation.
STUDENT OUTCOMES (SCALE: 1-3)	

a	b	c	d	e	f	g	h	i	j	k
3		1		3						2

3 – Strongly supported 2 – Supported 1 – Minimally supported

* Student Outcomes