

COURSE NUMBER: Vm412		COURSE TITLE: Advanced Strength of Materials	
TERMS OFFERED: Summer		PREREQUISITES: Vm 311 Strength of Materials	
TEXTBOOKS/REQUIRED MATERIAL: J. R. Barber, Intermediate Mechanics of Materials, McGraw-Hill		INSTRUCTOR: Roberto Dugnani DATE OF PREPARATION: October 9, 2012 DATE OF UC APPROVAL:	
INSTRUCTOR(S): Roberto Dugnani		SCIENCE/DESIGN: n/a	
CATALOG DESCRIPTION: Review of energy methods; elastic, thermoelastic, and elastoplastic analysis of axisymmetric thick cylinders and rotating discs; bending of rectangular and circular plates, including asymmetric problems; beams on elastic foundations; axisymmetric bending of cylindrical shells; torsion of prismatic bars.		COURSE TOPICS: 1. Axisymmetric thick cylinders and rotating discs, thermoelastic and elastoplastic analyses 2. Beams on elastic foundations 3. Axisymmetric bending of cylindrical shells 4. Torsion of prismatic bars	
COURSE STRUCTURE/SCHEDULE: Lecture twice per week, 90 minutes each;			
COURSE OBJECTIVES [Course Outcomes in brackets]	<ol style="list-style-type: none"> To teach students how to formulate problems involving axisymmetric thick cylinders and rotating discs [1, 5, 12] To teach students how to solve problems involving axisymmetric thick cylinders and rotating discs for different surface conditions and temperature distributions [1, 5, 11, 12] To teach students how to determine the elastic and plastic response in axisymmetric thick cylinders and rotating discs [1,5,11,12] To teach students how to formulate and solve problems involving beams on an elastic foundation [1, 5, 11, 12] To teach students how to formulate and solve problems involving axisymmetric bending of cylindrical shells [1, 5, 11, 12] To teach students how to formulate and solve the problem of the torsion of prismatic bars [1, 5, 11, 12] 		
COURSE OUTCOMES [Program Outcomes in brackets]	After completing Vm411, students should be able to: <ol style="list-style-type: none"> Formulate problems involving axisymmetric thick cylinders and rotating discs [2, 3, 4] Determine stresses and displacements in axisymmetric thick cylinders and rotating discs for different conditions at the surfaces, or due to temperature changes [2, 3, 4] Determine stresses associated with plastic yield in axisymmetric thick cylinders and rotating discs [2, 3, 4] Determine deflections and stresses in beams on an elastic foundation [5] Determine stresses and deformations due to axisymmetric bending of cylindrical shells [6] Determine stresses and deformations due to torsion of prismatic bars [7] 		
ASSESSMENT TOOLS [Course Outcomes in brackets]	Homework [2, 8, 9, 10, 11] Project assignments [2, 8, 9, 10, 11] Final Exam [8, 9, 10, 11]		