CLASS INFORMATION
Instructor: Prof. S.C. COWIN (contact by email sccowin@gmail.com or home phone 858-217-6108)

COURSE DESCRIPTION
This course begins with a review of matrix algebra and tensor notation, then presents a development of continuum kinematics, a formulation of physical principles in the continuum context, and a general formulation of constitutive equations. These elements are then used to develop the theories of elastic solids, viscous fluids and viscoelastic solids. A major objective of this course is to present an entirely new and unique development of material anisotropy.

PREREQUISITES: ME 304 (or CIVE 301) and AE 340.


Materials: Any symbolic algebra computer program, e.g. Mathematica, Maple, etc

STUDENT LEARNING OUTCOMES (SLOS):
Upon completion of this course the student will be able to:
SLO#1: Understand and apply matrix algebra and Cartesian tensor notation.
SLO#2: Understand and apply the kinematic measures of continuum mechanics, position, displacement, velocity, strain, rate of deformation
SLO#3: Understand and apply the continuum formulations of the physical laws of mass, momentum and energy conservation; definition of the stress tensor.
SLO#4: Understand and apply the ideas of material symmetry
SLO#5: Understand and apply the rules for the formation of constitutive equations.
SLO#6: Understand how the five topics above are employed in the theories of elastic solids, viscous fluids and viscoelastic solids.

PREREQUISITES BY TOPIC:
1. Differential and integral calculus through the divergence theorem
2. Vector analysis
3. Introductory fluid mechanics
4. Mechanics of materials

Class/Laboratory Schedule: Two 75-minute lectures/week

Computer Usage: Access to a computer and the internet is necessary.

GRADING
1. HOMEWORK: Homework will count 15% of your grade.
2. QUIZZES: A quiz will be given at the beginning of each class. The average of these quizzes will count 50% of the grade. There will be no make-up for any quiz missed. If, after taking a quiz, the student does not stay for the entire class, he or she will be given a zero on that quiz. The rationale for this quizzing arrangement is that the material of the course is layered and each subsequent layer of material uses results from the previous layers and therefor, the students must keep up with the class and the instructor must evaluate student progress at each class.
3. EXTRA POINTS: Extra points will count 5% of your grade. Extra points are earned in the following ways:
   (a) by submitting possible homework/Quiz problems with their solutions clearly detailed, (b) by submitting typographical corrections or corrections of errors in the text material.
4. GRADE STATUS REPORTS: At the (1/4), (1/2) and (3/4) points in the semester, that is to say after 7th, 14th and 21st classes the quiz average and HW averages are calculated. Excel files containing these quarter semester reports are distributed to the class. To identify your position in the class you have to identify your row in the file through your knowledge of your quiz or HW grades. Normally, for the first quarter I add the seven quiz grades together and divide by 6.5 to obtain an average. For the half semester I add the 14 quiz grades together and divide by 13 to obtain an average. At the three quarter point it is 21 quizzes divided by 19.5 and at the end it is 28 quizzes divided by 26. This effectively allows everyone to drop two quizzes. This method often leads to averages over 100 early in a semester, but these averages reduce to numbers below 100 as the semester advances.
5. DETERMINATION OF FINAL GRADE: The final grade will be calculated as follows: Class Quizzes 50%, Final Exam 30%, Homework 15% and Extra points 5%. Points for missing class, or late submission of work, will be subtracted from this total.