



## **ME 6201 – Principles of Continuum Mechanics**

**Fall 2023**

**Tue: 9:30 – 10:45 AM / Thu: 9:30 – 10:45 AM**

Credit:	3-0-3 (3 credits, 3 hours per week)
Prerequisites:	Introduction to partial differential equations and vector mathematics desirable (MATH 4581 or equivalent); or with the consent of the instructor.
Instructor:	Dr. Stephane Berbenni Office: 101, Level 1 -GTL Tel.: +33 (0) 3 8720 3931 Email: <a href="mailto:stephane.berbenni@georgiatech-metz.fr">stephane.berbenni@georgiatech-metz.fr</a>
Office Hours:	Tue: 10:45 – 11:45 AM / Thu: 10:45 – 11:45 AM
Textbook:	• Lawrence E. Malvern, Introduction to the Mechanics of a Continuous Medium, 1st Edition Prentice-Hall, 1997.
Objectives:	This class will provide knowledge of the fundamental, unifying concepts of the mechanics of continua as a core course for graduate study in Mechanical Engineering.
Topics:	<ul style="list-style-type: none"><li>• Fundamentals of Vectors, Tensors (chapter 1)</li><li>• Definition of Strain, Eulerian and Lagrangian Coordinate Systems (chapter 2)</li><li>• Definition of Stress, Cauchy and Nominal Stresses, Balance of Linear and Angular Momentum, Principal Stresses, Deviatoric and Hydrostatic Stress (chapter 3)</li><li>• First and Second Laws of Thermodynamics for a Continuum (chapter 4)</li><li>• Fundamentals of Elastic Behavior of Solids, Navier's equation, Airy stress function (chapter 5)</li><li>• Fundamentals of Fluids, Newtonian Fluids and Navier-Stokes Equations, Ideal and Rotational Flows, Laminar and Turbulent Flow (chapter 6)</li></ul>
Assignments:	Homework assignments will be graded. There will be homework for each chapter. No late assignments will be accepted (except acceptable reason). All class handouts will be available in the Fall 2023 Canvas course. Assignments and solutions will be posted on Canvas.

Attendance at lectures is required.

Evaluation:           30% Homework  
                          30% Mid-term Exam  
                          40% Final Exam

Grading Scale        Your final grade will be assigned as a letter grade according to the following scale:  
A       90-100%  
B       80-89%  
C       70-79%  
D       60-69%  
F       0-59%

Important dates:    1<sup>st</sup> day: Tue., August 22 (introductory lecture)  
                          Mid-term examination: *TBD*  
                          Drop day: *TBD*  
                          Recess week: October 30-November 5  
                          Final instructional day: Tue., December 5  
                          Final examination: 2 hours and 50 minutes. *TBD*. The final exam week is scheduled on December 7-14.

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Student-Faculty Expectations Agreement:

At Georgia Tech we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See <http://www.catalog.gatech.edu/rules/22/> for an articulation of some basic expectation that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.