

AE 227: Solid Mechanics

Course Instructor: Dr. Krishnendu Halдар

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Office Hour: open office policy (if possible please fix an appointment before dropping by my office)

Overview:

The course is designed to provide the students insight into the basics of mechanics of solids.

Course Content:

Deformation of bodies, Physical mechanisms of deformation, Deformation: Displacements and Strains, Small strain (2D Cartesian-system, 2D polar-system), Strain in an arbitrary direction, Strain transformation, Maximum normal strain, Maximum shear strain, Principal strains, Concept of stress, Stress tensor, Equilibrium equation in Cartesian and polar system, Stress components on arbitrary plane (2D), Stress transformation, Maximum normal stress, Maximum shear stress, Principal stresses, Mohr's circle for biaxial stresses, Constitutive relations, Material behaviour-linear elastic, Formulation and solution strategies, Two dimensional formulation, Two dimensional problem solution (Airy stress function)

Axially loaded bars, Torsion, Shearing forces and bending moments, Forces on beam-section, Shearing force and bending moment diagrams, Strain energy.

References:

1. Martin Sadd, Elasticity: Theory, Applications, and Numerics, Academic Press, 2014.
2. Timoshenko And Goodier, Theory Of Elasticity, McGraw Hill Education, 2017.
3. Egor P. Popov, Engineering Mechanics of Solids, Prentice Hall, 1976.

Grading policy: Grades are strictly based on the following break-up:

Assignments : 40%

Mid-sem : 30%

End-sem : 30%

Grades will be assigned by normalizing the score of every student with the highest score. Subsequently, the letter grades are assigned based on the score range given below:

AA: 100 – 90

AB: 90 – 80

BB: 80 – 70

BC: 70 – 60

CC: 60 – 50

CD: 50 – 40

DD: 40 – 35

FR: Below 35

Note: The above system is based on the assumption that the overall score of atleast one student is greater than or equal to 85. If none of the students in the class score marks greater than or equal to 85 then no one will be given an AA grade. In such a circumstance the scores of all the students will be normalized according to the formula: **score = (your_actual_score) x 90/85**. Letter grades then will be assigned based on the split give above.