1.050 Engineering Mechanics

Lecture 16:

Introduction: Deformation and strain

1.050 – Content overview

I. Dimensional analysis

1. On monsters, mice and mushrooms
2. Similarity relations: Important engineering tools

Lectures 1-3
Sept.

II. Stresses and strength

2. Stresses and equilibrium
3. Strength models (how to design structures, foundations.. against mechanical failure)

Lectures 4-15
Sept./Oct.

III. Deformation and strain

4. How strain gages work?
5. How to measure deformation in a 3D structure/material?

Lectures 16-19
Oct.

IV. Elasticity

5. Elasticity model – link stresses and deformation
6. Variational methods in elasticity

Lectures 20-31
Nov.

V. How things fail – and how to avoid it

7. Elastic instabilities
8. Plasticity (permanent deformation)
9. Fracture mechanics

Lectures 32-37
Dec.

1.050 – Content overview

I. Dimensional analysis

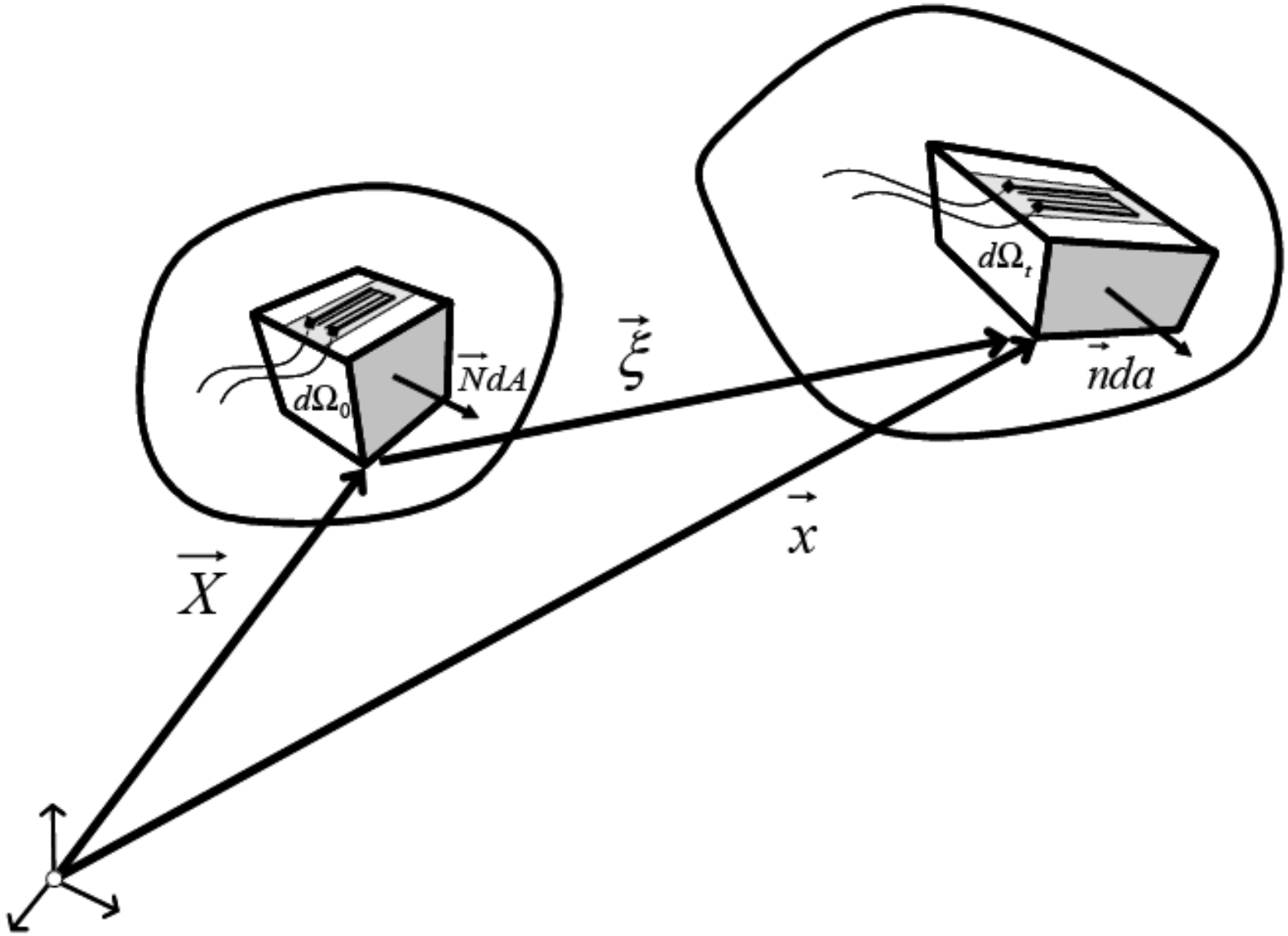
II. Stresses and strength

III. Deformation and strain

Lecture 16: Introduction: Deformation and strain
Lecture 17: Strain tensor and small deformation
Lecture 18: Mohr circle in strain space
Lecture 19: Beam deformation

IV. Elasticity

V. How things fail – and how to avoid it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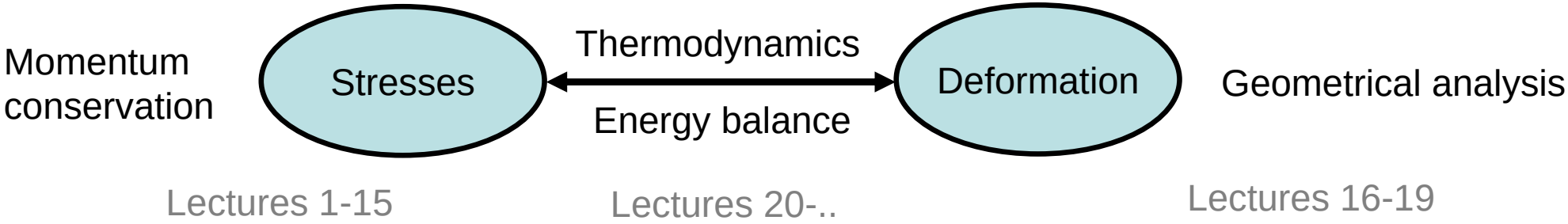
Momentum conservation
Stresses
Thermodynamics
Energy balance
Deformation
Geometrical analysis
Lectures 1-15
Lectures 20-..
Lectures 16-19

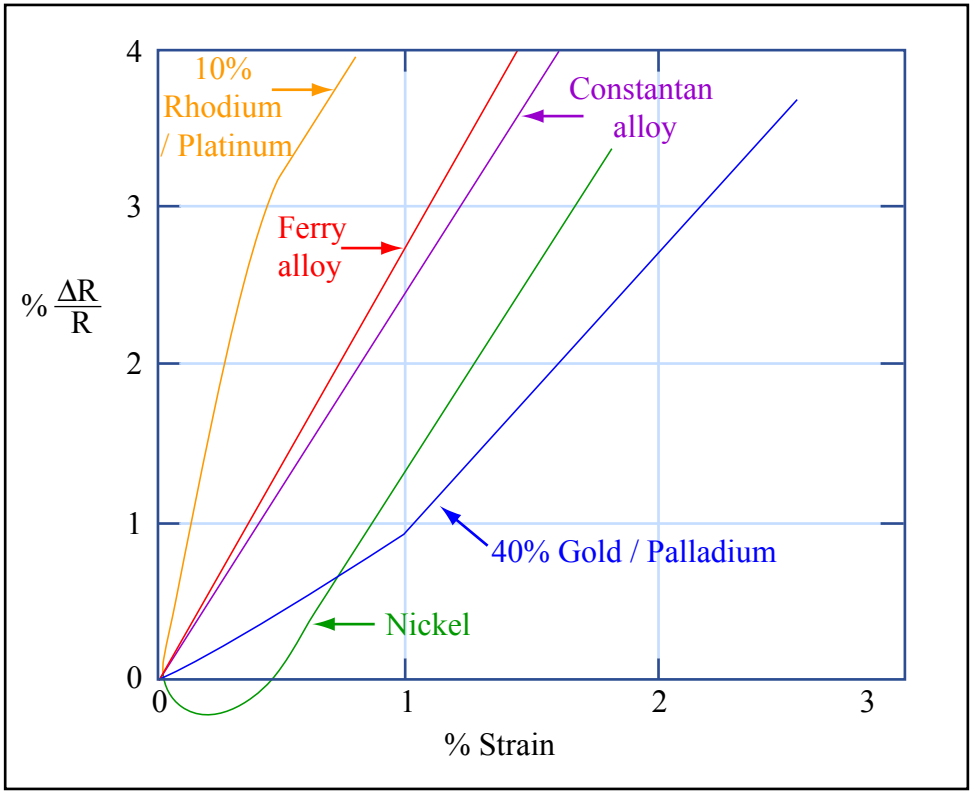

Figure by MIT OpenCourseWare.