

# Everything about ES 241 Advanced Elasticity

Mechanics, thermodynamics, polymers

Zhigang Suo [@zhigangsuo](#)

You are invited to [discuss this course on X](#)

**Lectures:** Maxwell Dworkin 221, Tuesday and Thursday 1:30 PM - 2:45 PM (Fall 2024)

**Office hour:** After each class, or appointment by email.

## Teaching Fellow

Sammy Hassan

[shassan@g.harvard.edu](mailto:shassan@g.harvard.edu)

## Grades

Homework 40%

Final exam 60%

We will have a closed-book final exam. Exam problems will be similar to homework problems.

## Textbook

I will adopt a draft of a [book](#) that Rui Huang and I are writing. As the semester progresses, chapters will be released in the table below.

[Tweets by Rui Huang](#) on his course using the same book

[Schedule of Rui Huang's course](#)

## Class Notes, Problem Sets

Jan 23	<a href="#">Polymer network, uniaxial stress</a>	
Jan 25	<a href="#">Multiaxial stress</a>	
Jan 30	<a href="#">Inhomogeneous deformation</a>	
Feb 1	<a href="#">Inhomogeneous deformation</a>	<a href="#">HW 01-04</a>
Feb 6	<a href="#">Basic algorithm of thermodynamics</a>	

Feb 8	<a href="#">Entropy</a>	<a href="#">HW 05-08</a>
Feb 13	<a href="#">Temperature</a>	
Feb 15	<a href="#">Free energy</a>	<a href="#">HW 09-12</a>
Feb 20	<a href="#">Pressure</a>	
Feb 22	<a href="#">Entropic elasticity of gas</a>	<a href="#">HW 13-16</a>
Feb 27	<a href="#">Entropic elasticity of elastomer</a>	
Feb 29	<a href="#">Free energy of elastomer</a>	<a href="#">HW 17-20</a>
Mar 5	<a href="#">Free energy of elastomer</a>	
Mar 7	<a href="#">Geometry of homogeneous deformation</a>	<a href="#">HW 21-24</a>
Mar 19	<a href="#">Geometry of homogeneous deformation</a>	
Mar 21	<a href="#">Geometry of homogeneous deformation</a>	<a href="#">HW 25-28</a>
Mar 26	<a href="#">Thermodynamics of homogeneous deformation</a>	
Mar 28	<a href="#">Thermodynamics of homogeneous deformation</a>	<a href="#">HW 29-32</a>
Apr 2	<a href="#">Thermodynamics of homogeneous deformation</a>	
Apr 4	<a href="#">Inhomogeneous deformation</a>	<a href="#">HW 33-36</a>
Apr 9	<a href="#">Basic algorithm of statistical mechanics</a>	
Apr 11	<a href="#">Statistical mechanics of rubber elasticity</a>	<a href="#">HW 37-40</a>

Apr 16	<a href="#">Chemical potential</a>	
Apr 18	<a href="#">Polymer gels</a>	<a href="#">HW 41-44</a>
Apr 23	<a href="#">Dielectric elastomers</a>	
May 10	Final Exam 9:00 AM - 12 Noon Emerson 101	<a href="#">HW 45-50</a>