

**NANO 202/CENG 212: Intermolecular and Surface Forces
Fall 2015**

Instructor

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Text

Israelachvili, J. *Intermolecular and Surface Forces*, 3rd Edition (2nd edition is fine), available at the bookstore.
Textbook is also available electronically from the UCSD Library Website
Additional readings may be assigned

Electronic resources

ted.ucsd.edu will contain an updated version of this syllabus, lecture notes, old exams, homework problems, and reading materials

Podcast

An audio recording of the lectures will be posted to podcast.ucsd.edu immediately following the lecture. There are however sometimes technical glitches with this service and the availability of the podcasts cannot be guaranteed.

Reserve list

In addition to Israelachvili, the following books have been placed on reserve in the Geisel Library as supplements. (Reading will not be assigned from these books, but they are available for your enrichment.)

- Berg, J. C. *An introduction to interfaces & colloids: the bridge to nanoscience*
- Witten, T. *Structured fluids: polymers, colloids, surfactants*
- De Gennes, P.-G. et al. *Capillarity and wetting phenomena: drops, bubbles, pearls, waves*
- Butt, H.-J., Kappl, M. *Surface and interfacial forces*

Class time and location

Monday and Wednesday, 7 – 8:20 pm
Warren Lecture Hall (WLH) 2207

Homework

Problems will be assigned in association with most chapters and posted on Ted. Solutions will be posted or given in class. Homework will not be graded, but knowing its content will be necessary to do well on the exams.

Grading

- Midterm exams (2): 25% each
- Final exam: 50%

Schedule

Class	Date	Chapter	Topic
1	9/28	1	Overview
2	9/30	2	Thermodynamic and statistical aspects
3	10/5	3	Coulomb interactions
4	10/7	4	Interactions involving polar molecules
5	10/12	5	Interactions involving polarization of molecules
6	10/14	6	Van der Waals forces
7	10/19	7,8	Steric repulsive interactions, water, and H-bonding
8	10/21	–	Review for Midterm 1
9	10/26	–	Midterm 1
10	10/28	10	Surface tension and introduction to surface forces
11	11/2	11	Van der Waals forces between particles & surfaces
12	11/4	13	The Hamaker constant and applications of VDW forces between surfaces
13	11/9	14	Electrostatic double layer forces
–	11/11	–	(Veteran's day, no class)
14	11/16	15	Solvation, structural, hydration forces
15	11/18	16	Steric, polymer-mediated forces
16	11/23	17	Adhesion and wetting
17	11/25	18	Friction and lubrication
18	11/30	19	Principles of self-assembly
–	12/2	–	Midterm 2
–	12/9	–	Final Exam, 7 – 10 pm, location TBA

Exams

Exam questions will cover material from the lecture notes, homework, and previous years' exams. *If a topic is covered in the book, but is not mentioned in the above places, it will not be covered on the exam.*

Grading

Course grades will be computed using two methods, and the higher of the two grades will be used as the final grade. In the first method, I will rank the class from top to bottom and distribute 25% As, 25% Bs, 30% Cs, and 20% Ds & Fs. In the second method, I will assign letter grades based on an absolute scale of the points earned in the course, as follows:

93 – 100	A
85 – 92	A–
77 – 84	B+
69 – 76	B
61 – 68	B–
50 – 60	C+
40 – 49	C
31 – 39	C–
21 – 30	D
0 – 20	F

Crying

No crying.