

## Syllabus: CE 131 - Advanced Mechanics of Materials

Instructor: Shaofan Li

Day	Subject	
8/29	Introduction and Stress Tensor	1.1,1.2,1.3,Appendix A
8/31	Equilibrium Equations and Cauchy's Formula	1.4,1.5,1.6,1.7
9/2	Stress Transformation and Principal Stresses	1.8-1.10,Appendix B
9/5	Labor day	
9/7	3D Mohr's circle (*)	Lecture notes,1.11-1.16
9/9	Definition of Strain	2.1-2.3
9/12	Transformation of strain	2.5
9/14	Compatibility equations	2.4
9/16	Constitutive relations	2.8-2.9
9/19	Generalized Hooke's law	2.10-2.14
9/21	Two-dimensional problems in linear elasticity	3.1,3.2
9/23	Airy's stress function (I)	3.3-3.5
9/26	Airy's stress function (II)	3.6-3.8
9/28	Stress concentration (I): wedge solution	3.9-3.11
9/30	Stress concentration (II): a plate with a hole	3.11
10/3	Polar coordinate	3.8
10/5	Axisymmetrically loaded members (I)	3.9,3.10
10/10	Axisymmetrically loaded members (II)	8.1,8.2,8.5
10/12	Torsion theory (I)	6.1,6.2
10/14	Torsion theory (II)	6.3,6.4
10/17	Torsion (III): Warping	6.5,6.6,
10/19	Torsion (IV): Prandtl's theory	6.7
10/21	Torsion (V): Non-circular cross section	6.7
10/24	Midterm Examination	
10/26	Beam on elastic foundation (I)	9.1,9.2,9.3
10/28	Beam on elastic foundation (II)	9.4
11/2	Beam on elastic foundation (III)	9.4
11/4	Energy Method (I)	10.1, 10.2, 10.3

11/7	Energy Method (II)	10.4,10.5,10.8,10.9
11/9	Energy method (III)	10.10,10.11
11/11	Finite Element Method (I)	7.1,7.6
11/14	Finite Element Method (II)	7.7,7.8
11/16	Finite Element Method (III)	7.9
11/18	Finite Element Method (IV)	7.9
11/21	Finite Element Method (V)	7.10
11/23	Finite Element Method (VI)	Lecture Notes
11/25	Thanksgiving holiday	
11/28	Thin plate theory (I)	13.1,13.2
11/30	Thin plate theory (II)	13.3,13.4,13.5
12/2	Thin plate theory (III)	13.6,13.7
12/5	Thin plate theory (IV)	13.8
12/7	Thin plate theory (V)	Lecture Notes
12/9	Thin plate theory (VI)	Lecture Notes

The lecture is held on every MWF from 12:00 pm - 1:00 pm at 534 Davis Hall.

Textbook: A. C. Ugural and S. K. Fenster, *Advanced Strength and Applied Elasticity*, 4 th, Edition, Prentice Hall;

Sign \* denotes the lecture containing materials outside the designated textbook.

Grading: HW 30 %, Midter 30 % Final Exam 40%

Office Hour: TF 3:30-5:00 pm (783 Davis Hall)

HW: HW Problems pertaining to lectures will be assigned on each Friday and collected on the next Friday.

Email: li@ce.berkeley.edu

Tel: (510)-642-5362

All the lecture notes and HW solutions will be posted at:

<http://www.ce.berkeley.edu/Course/CE131>

Discussion session is held at 502 Davis Hall on every tuesday from 5:00 pm to 6:00 pm.

TA's office hour: Thursday 4:00 pm - 5:00 pm at 504 Davis Hall;

GSI: Anurag Gupta

Email: agupta@berkeley.edu

Reader: Mr. Yuli Huang

Email: yulee@berkeley.edu

Referenece Books (Reserved in Engineering Library)

Egor P. Popov [1998], *Engineering Mechanics of Solids*, Prentice Hall