

## CE 542 Theory of Plates and Shells (3)

2019 Spring Semester — **Tentative** Course Syllabus

Lecture	Monday	6:40p.m. to 9:20p.m.	OHE 100D
Professor	Dr. A. Niaz, P.E.		
Email	<a href="mailto:Niaz@usc.edu">Niaz@usc.edu</a>		
Textbook • Required	<b>A. C. Ugural, "Plates and Shells: Theory and Analysis," 4<sup>th</sup> edition," CRC Press, 2018, ISBN-13: 978-1138032453.</b>		
References	<ol style="list-style-type: none"> <li>1. Reddy, J. N., "Theory and Analysis of Elastic Plates and Shells," CRC, 2<sup>nd</sup> edition, December 2006.</li> <li>2. R. Szilard., "Theory and Analysis of Plates," Prentice Hall, 1974.</li> <li>3. P.L. Gould, "Analysis of Shells and Plates," Prentice Hall, 1999.</li> <li>4. E.H. Mansfield "The Bending and Stretching of Plates," 2<sup>nd</sup> edition, Cambridge University Press, 1989.</li> <li>5. S. Timoshenko, and S. Woinowsky-Krieger "Theory of Plates and Shells," McGraw-Hill, 1959.</li> <li>6. W. Pilkey, "Stress, Strain, and Structural Matrices," 1st edition, John Wiley &amp; Sons, Inc., 1994.</li> <li>7. W. Young &amp; W. Budynas, "Roark's Formulas for Stress and Strain," 7th Edition, McGraw-Hill Inc., 2002.</li> </ol>		
Course Description	<b>Theory of plate</b> bending; rectangular and circular plates; energy methods; numerical methods; vibration of plates, stability of plates, introduction to <b>shell theory</b> , membrane and bending stresses, cylindrical shells.		
Course Objectives	To achieve fundamental understanding of the classical theory of elastic plates and shells, address limitations and differences, introduce nomenclature, and present analytical and numerical solution techniques.		
Learning Objectives	To enable students to apply the theory of <b>plates and shells</b> to problems, involving various geometries and boundary conditions, to diverse problems in civil, mechanical, aerospace engineering, and other related fields.		
Policies on:			
Exams	<ul style="list-style-type: none"> <li>• Closed book.</li> <li>• Only one sheet of 8.5" x 11" paper (two pages) of formulae allowed.</li> <li>• Calculator.</li> <li>• Students <b>must turn in questions sheets</b> with their answer sheets at the end of each exam.</li> </ul>		
Homework	Homework problems, which are assigned weekly, are <b>due on</b> the following <b>Monday, by 6:40 p.m.</b> in Los Angeles, CA, USA; <b>unless otherwise instructed</b> .		
Late work	Not to be accepted.		
<b>Make-up work</b>	<b>No make-up on any examinations.</b>		
Incomplete work	To be graded accordingly.		
Extra credit	No extra Credit.		
Final grade scheme is based on total percentage of graded coursework	Homework: :	<b>20%</b>	
	Project:	<b>20%</b>	
	Midterm Exam:	<b>20%</b>	
	Final Exam:	<b>40%</b>	
	Total:	<b>100%</b>	

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### Tentative Class Calendar

Week	Monday	Topic	Assignment	Delivery
1	1/7	Plates: Introduction/Fundamentals	HW 1	
2	1/14	Plate-Bending Theory: Classical Solution Methods/Rectangular Plates	HW 2	HW 1
3	1/21	<i>No Class, Martin Luther King Day, university holiday</i>		
4	1/28	Rectangular Plates/Circular Plates	HW 3	HW 2
5	2/4	Circular Plates/Plates on Elastic Foundations	HW 4	HW 3
6	2/11	Analysis of Membranes/Bending & Stretching/Energy Methods/Ritz Method	HW 5	HW 4
7	2/18	<i>No Class, Presidents' day, university holiday</i>		
8	2/25	Large Deflection, Stability: Fundamentals/Applications, Dynamics: Free Vibrations	HW 6/ <b>Project</b>	HW 5
<b>9</b>	<b>3/4</b>	<b>Midterm Exam (120 minutes)</b>		
10	3/11	<i>Spring Recess: Monday, March 10 - Sunday, March 17</i>		
11	3/18	Anisotropic Plates	HW 7	HW 6
12	3/25	Shells: Introduction/ Membrane Theory/ Membrane Stresses	HW 8	HW 7
13	4/1	Membrane Theory/ Membrane Stresses & Bending Theory/ Bending Stresses	HW 9	HW 8
14	4/8	Bending Theory/ Bending Stresses & Cylindrical Shells under General Loads/Buckling	HW 10	HW 9
15	4/15	Applications: Pipes, Tanks, Pressure Vessels	HW 11	HW 10/ <b>Project</b>
16	4/22	Plates & Shells: Numerical Methods		HW 11
17	4/29	<i>Study Days: Saturday, April 27 – Tuesday, April 30.</i>		
<b>18</b>	<b>5/6</b>	<b>Final Exam, (120 minutes): 7:00pm to 9:00pm</b>		

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### **STATEMENT ON ACADEMIC INTEGRITY**

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own.

All students are expected to understand and abide by these principles. *SCampus*, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A:

<http://www.usc.edu/dept/publications/SCAMPUS/gov/>

Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at:

<http://www.usc.edu/student-affairs/SJACS/>

The Viterbi Honor Council presents the following honor code:

Engineering enables and empowers our ambitions and is integral to our identities. In the Viterbi community, accountability is reflected in all our endeavors.

Engineering + Integrity.  
Engineering + Responsibility.  
Engineering + Community.  
Think good. Do better. Be great.

These are the pillars we stand upon as we address the challenges of society and enrich lives.

### **STATEMENT FOR STUDENTS WITH DISABILITIES**

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible.

#### **DSP Contact Information**

Location: STU 301  
Hours open: 8:30 a.m. until 5:00 p.m., Monday — Friday  
Phone number: (213) 740-0776

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### Statement on Academic Conduct and Support Systems

#### Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” <https://policy.usc.edu/scampus-part-b/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

#### Support Systems:

*Student Counseling Services (SCS)* - (213) 740-7711 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. <https://engemannshc.usc.edu/counseling/>

*National Suicide Prevention Lifeline* - 1-800-273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. <http://www.suicidepreventionlifeline.org>

*Relationship and Sexual Violence Prevention Services (RSVP)* - (213) 740-4900 - 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. <https://engemannshc.usc.edu/rsvp/>

*Sexual Assault Resource Center*

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: <http://sarc.usc.edu/>

*Office of Equity and Diversity (OED)/Title IX Compliance* – (213) 740-5086

Works with faculty, staff, visitors, applicants, and students around issues of protected class. <https://equity.usc.edu/>

*Bias Assessment Response and Support*

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. <https://studentaffairs.usc.edu/bias-assessment-response-support/>

*The Office of Disability Services and Programs*

Provides certification for students with disabilities and helps arrange relevant accommodations. <http://dsp.usc.edu>

*Student Support and Advocacy* – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. <https://studentaffairs.usc.edu/ssa/>

*Diversity at USC*

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. <https://diversity.usc.edu/>

*USC Emergency Information*

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible, <http://emergency.usc.edu>

*USC Department of Public Safety* – 213-740-4321 (UPC) and 323-442-1000 (HSC) for 24-hour emergency assistance or to report a crime.

Provides overall safety to USC community. <http://dps.usc.edu>