

Plates and shells

1. **Course number and name:** 020PLCGS5 Plates and shells
2. **Credits and contact hours:** 4 ECTS credits, 2x1.25 hours
3. **Name(s) of instructor(s) or course coordinator(s):** Fouad KADDAH
4. **Instructional Materials:**
 - a. Traite de Genie Civil de l'Ecole polytechnique federale de Lausanne Volume 5: Analyse des structures et milieux continus ; Coques ; Auteurs : Francois Frey et Marc Andre Studer
 - b. Modelisation des structures par elements finis ; Volume 3 Coques ; Auteurs : Gouri Dhatt et Jean Louis Batoz
 - c. Modelisation des structures par elements finis; Volume 2, Poutres et plaques
 - d. Theory of plates and shells, second edition, Auteurs: S. Timoshenko and S. Woinowsky-Krieger; International Student Edition
 - e. Shell Structures in Civil and Mechanical Engineering; Auteur: Alphonse Zingoni; Thomas Telford Publishing 1997
 - f. Mecanique des structures Tome 1 2e edition: Solides elastiques et plaques et coques; Auteurs: S. Laroze et J.-J. Barrau ; Eyrolles Masson 1988
 - g. Instructor's Class Notes
5. **Specific course information**
 - a. **Catalog description:** Provide the theoretical elements to pre-dimension and analyze structural elements such as slabs, walls, roof, tanks and folded structures.
 - b. **Prerequisites or co-requisites:** 020STRGS4 Structures
 - c. **Required:** Required course for Public Works and Transportation Specialty students.
6. **Educational objectives for the course**
 - a. **Specific outcomes of instruction:**
 - Understand the path of stresses in plate and shell structures;
 - Development of simplified methods for stress analysis and design of plates and shells
 - Understand how to efficiently undertake numerical modeling of plates and shells by finite elements
 - b. **PI addressed by the course:**

PI	1.1	1.2	1.3	1.4
Covered	yes	yes	yes	yes
Assessed				

7. Brief list of topics to be covered:

1. General introduction on plates and shells (3 hours)
2. Kirchhoff's theory of plates (3 hours)
3. Bending theory of rectangular plates (6 hours)
4. Bending theory of circular plates (3 hours)
5. Surface geometry (2 hours)
6. Love's theory of shells (2 hours)
7. Membrane theory of shells of revolution (5 hours)
8. Bending theory of shells of revolution (4 hours)
9. Junction of shells of revolution (2 hours)