M2795.002400
Aircraft Structures

1. Instructor: Prof. SangJoon Shin (Building 301Room 1418, ssjoon@snu.ac.kr)

2. Class date: Tuesdays, Thursdays 9:30 AM – 10:45 PM

3. Classroom: Building 301Room 303

4. Assistant: Mr. Duhyun Gong (Building 301Room 1357, zpslem@snu.ac.kr)

5. Office Hours: Prof. SangJoon Shin (Tuesdays 11:00 AM – 12:00 PM)

6. Evaluation: Attendance (5%)
   Examination (Mid 25%, Final 35%)
   Homework Assignments (35%)

7. Textbook:
   - Lecture note

8. References:

   - Bauchau, O. A. and Craig, J. I., "Structural Analysis with Application to Aerospace Structures," Springer, 2009.

   - Bisplinghoff, R. L., Mar, J. W., and Pian, T. H. H., "Statics of Deformable Solids," Reading: Addison-Wesley, 1965; Dover Publications, 1990

9. Main contents: In this class, methodologies to compute an overall load path and approximate stress distribution will be learned by idealizing a realistic aircraft structures, in order to adopt them in the preliminary and detail design. Since the practical computations are conducted by numerical analysis, physical and mechanical aspects will rather be emphasized by going through simple analysis problems involving low-order numerical computation.

	Week	Contents
Class plan	1	Historical Perspective
	2	Basic Equations of Linear Elasticity
	3	Constitutive Behavior of Materials
	4	Engineering Structural Analysis (Hyperstatic systems)
	5	Torsion (Circular cylinders)
	6	Torsion (Saint-Venant’s solution)
	7	Thin-walled Beams (Shearing of thin-walled beams)
	8	Thin-walled Beams (Shear center)
	9	Thin-walled Beams (Torsion of thin-walled beams)
	10	Thin-walled Beams (Warping of thin-walled beams under torsion)
	11	Virtual Work Principles (Principle of virtual work)
	12	Virtual Work Principles (Principle of complementary virtual work)
	13	Energy Methods (Principle of minimum total potential energy)
	14	Energy Methods (Principle of minimum complementary energy)
	15	Energy Methods (Energy theorems)
Pre-requisites	Solid Mechanics, Mechanics and Design	

	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1				9/1 Lecture 1	
Week 2		9/6 Lecture 2		9/8 Lecture 3	
Week 3		9/13 Lecture 4		9/15 **Holiday**	
Week 4		9/20 Lecture 5		9/22 Lecture 6	
Week 5		9/27 Lecture 7		9/29 **No class**	
Week 6		10/4 **No class**		10/6 **No class**	
Week 7		10/11 Lecture 8		10/13 Lecture 9	
Week 8		10/18 Lecture 10		10/20 Lecture 11	
Week 9		10/25 Practice 1		10/27 **Mid Exam**	
Week 10		11/1 Lecture 12		11/3 Lecture 13	
Week 11		11/8 Lecture 14		11/10 Lecture 15	
Week 12		11/15 Lecture 16		11/17 **No class**	
Week 13		11/22 Lecture 17		11/24 Lecture 18	
Week 14		11/29 Lecture 19		12/1 Lecture 20	
Week 15		12/6 Lecture 21		12/8 Practice 2	
Week 16		12/13 **Final Exam**			