M2795.002400
Aircraft Structures

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

2. Class date: Mondays, Wednesdays 11:00 – 12:15 PM

3. Classroom: Building 301 Room 303

4. Assistant:

5. Office Hours: Prof. SangJoon Shin (Mondays, Wednesdays 2:00 – 3:00 PM)

6. Evaluation: Attendance (10%)
   Examination (Mid 30%, Final 40%)
   Homework Assignments (20%)

7. Textbook:
   - Lecture note (can be downloaded from http://rotary.snu.ac.kr)

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

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 be emphasized by going through simple analytical problems involving low-order numerical computation.

	Week	Contents
Class plan	1	Historical Perspective
	2	Engineering Structural Analysis (Hyperstatic systems)
	3	Torsion (Circular cylinders)
	4	Torsion (Saint-Venant's solution)
	5	Thin-walled Beams (Shearing of thin-walled beams)
	6	Thin-walled Beams (Shear center)
	7	Thin-walled Beams (Torsion of thin-walled beams)
	8	Thin-walled Beams (Warping of thin-walled beams under torsion)
	9	Virtual Work Principles (Principle of virtual work)
	10	Virtual Work Principles (Principle of complementary virtual work)
	11	Energy Methods (Principle of minimum total potential energy)
	12	Energy Methods (Application to trusses and beams)
	13	Energy Methods (Development of finite element formulations for trusses)
	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		9/3 Lecture 2		
Week 2	9/8 **Holiday**		9/10 **Holiday**		
Week 3	9/15 Lecture 3		9/17 Lecture 4		
Week 4	9/22 Lecture 5		9/24 Lecture 6		
Week 5	9/29 Lecture 7		10/1 Lecture 8		
Week 6	10/6 Lecture 9		10/8 Lecture 10		
Week 7	10/13 Lecture 11		10/15 **Holiday**		
Week 8	10/20 Lecture 12		10/22 Lecture 13		
Week 9	10/27 Practice 1		10/29 **Mid Exam**		
Week 10	11/3 Lecture 14		11/5 Lecture 15		
Week 11	11/10 Lecture 16		11/12 **No class**		
Week 12	11/17 Lecture 17		11/19 Lecture 18		
Week 13	11/24 Lecture 19		11/26 Lecture 20		
Week 14	12/1 Lecture 21		12/3 Lecture 22		
Week 15	12/8 Practice 2		12/10 **Final Exam**		
Week 16					