1	Title	Spacecraft Structure and Material	
2	Lecturer, Units	Keiichi Okuyama	2
3	Purpose	Spacecraft are required to endure severe environment such as micro-gravity, extreme vacuum, big temperature change, radiation and so on. Development of spacecraft requires broad knowledge of various fields. In this lecture, students will learn in what process spacecraft are designed, developed and operated in the viewpoint of structural dynamics and material mechanics. This Lecture focuses on general concepts applicable to various spacecraft designs but reinforce ideas with real failure examples.	
4	Lecture schedule	(1) Course introduction (2) Spacecraft environment 1 (The launch phase) (3) Spacecraft environment 2 (The space environment) (4) Spacecraft environment 3 (The re-entry environment) (5) Strength of Materials 1 (Stresses and Strain) (6) Strength of Materials 2 (Stresses in Beams) (7) Strength of Materials 3 (Deflection of Beams) (8) Midterm review (Midterm Exam.) (9) Spacecraft structure design philosophy (10) Spacecraft structure 1 (11) Spacecraft structure 2 (12) Materials 1 (Aluminum alloy, Honeycomb structure etc.) (13) Materials 2 (Composite materials etc.) (14) Structural testing for the evaluation (15) Final review (Final exam.), Structural analysis using FEM	
5	Evaluation	It will be described in the first lecture.	
6	Note	This lecture is provided in English. It is desirable for students to take the strength of structures (構造力学) or the material Strength (材料力学) in your bachelor's degree course.	
7	Textbook Reference	Textbook: Spacecraft Systems Engineering, edited by Peter Fortescue et al., Wiley Reference book: Elements of Strength of Materials, Timoshenko and Young, D. Van Nostrand Company	