

1	Title	Space Environment Testing	
2	Lecturer, Units	Mengu Cho	1
3	Purpose	A satellite is exposed to extreme environments such as vacuum, radiation and plasma. It is also exposed to severe vibration and shock onboard a rocket. Satellites have to operate maintenance-free and need to be tested thoroughly before the launch. The purpose of the lectures is to understand from the basics about necessity, background of test levels and conditions, judgment criteria of each test.	
4	Lecture schedule	<ol style="list-style-type: none"> <li>1. Space environment tests, why necessary?</li> <li>2. Satellite development and test strategy</li> <li>3. Vibration test principle</li> <li>4. Vibration test methods and analysis</li> <li>5. Shock test principle</li> <li>6. Shock test and analysis</li> <li>7. Thermal vacuum test principle</li> <li>8. Thermal vacuum test method and analysis</li> <li>9. Thermal vacuum or thermal cycle</li> <li>10. Antenna and communication test</li> <li>11. EMC test</li> <li>12. Outgas test</li> <li>13. Radiation test</li> <li>14. Radiation test</li> <li>15. Test standard</li> </ol>	
5	Evaluation	Reports and mini-test.	
6	Note	This lecture is provided in English. It is desirable for students to take space system related subjects, such as Space Systems Engineering and Introduction to Satellite Engineering. Also, laboratory workshop will be held in Space Environment Testing Workshop.	
7	Textbook Reference	Reference: HARRIS' SHOCK AND VIBRATION HANDBOOK, Allan G. Piersol, Thomas L Paez, Macgrawhill, Spacecraft Thermal Control Handbook, David G. Gilmore, Aerospace Press JAXA-JERG-2-130 「宇宙機一般試験標準」 SMC-S-016 “TEST REQUIREMENTS FOR LAUNCH, UPPER-STAGE AND SPACE VEHICLES” ISO-15864 “ Space systems — General test methods for space craft, subsystems and units” ECSS-ST-10-03 “Space Engineering – Testing”	