

1	Title	Advanced High Velocity Impact Engineering	
2	Lecture,Units	Yasuhiro Akahoshi	2
3	Purpose	The objective of this lecture is to gain the knowledge of the basic theories of high velocity impact such as fan blade off damage on fan case or hypervelocity impact on space structure such as space debris impact on International Space Station. In this lecture stress propagation and mechanism of hypervelocity impact phenomena will be addressed.	
4	Lecture schedule	<ol style="list-style-type: none"> <li>1 . Introduction of space debris</li> <li>2 . Introduction of low, high, hypervelocity impact</li> <li>3 . Fundamental relationships (1)</li> <li>4 . Fundamental relationships (2)</li> <li>5 . Material response (1: metals and ceramics)</li> <li>6 . Material response (2: composites)</li> <li>7 . Impedance</li> <li>8 . Non-penetrating impacts</li> <li>9 . Strength Effect</li> <li>10 . Tate model</li> <li>11 . HVI: semi-infinite target</li> <li>12 . HVI: finite target</li> <li>13 . Hydrocode</li> <li>14 . Scale Modeling</li> <li>15 . Summary</li> </ol>	
5	Grade Evaluation	Grade is evaluated by taking the score of short quiz and presentations into account.	
6	Guidline for Students	It is desirable or recommended for the students to take courses related to "Strength of Material", "Solid Mechanics" and so on in the undergraduate course.	
7	Preparation and Review	You should read distributed materials before the lecture and investigate some technical words which you cannot understand after the lecture.	
8	Textbook and References	<ol style="list-style-type: none"> <li>1 . Zukas et al, Impact Dynamics, KRIEGER, 1982</li> <li>2 . Melosh, Impact Cratering, OXFORD, 1989</li> <li>3 . Horie and Sawaoka, Shock Compression Chemistry of Materials, KTK Scientific Publishers, 1993</li> <li>4 . <a href="http://hitf.jsc.nasa.gov/hitfpub/main/index.html">http://hitf.jsc.nasa.gov/hitfpub/main/index.html</a></li> </ol>	