

	<p>materials and Material Mechanics.</p> <p>The course will begin by developing the theoretical framework for the fracture and strength of solids (e.g. theoretical cleavage strength, shear strength, Griffith theory) and then developing an understanding of brittle and ductile fracture. Then the techniques for the measurement of strength and fracture toughness will be presented, with a focus on the indentation technique, which is one important method for scientific research. In addition, this course will also present the basic concepts on the material strengthening and toughening (e.g. phase transformation toughening, composite approach, Eshelby theory, etc), as well as fractography. The course will also give students the recent research findings on the materials fracture or strength.</p> <p>This course will use several engineering materials, such as high temperature superalloy, thermal barrier coatings for aeroengine, fiber reinforced composites, nuclear fuel particles and light alloys, as examples, to introduce the knowledge of engineering fracture, for example, the creep, fatigue, stress corrosion and Hydrogen brittleness induced failure.</p> <p>The course will be interactive and there will be periods for students to raise questions and discuss aspects of their own experimental work with the instructor.</p>			
<p>* () Syllabus</p>				
	1 3	<p>1. 1.1 1.2 1.3 (Ingles Theory) 1.4 Griffith 1.5 1.6 1.7 1.8</p>	6	/
	4 5	<p>2. 2.1 2.2 2.3 / 2.4 2.5 Webull 2.6</p>	4	/
	6 7	<p>4. 4.1 4.2 4.3 4.4 4.5 4.6 Eshelby 4.7 4.8</p>	4	/
	8	/	2	/
	9 10	<p>5. 5.1 5.2</p>	4	/

		5.3 5.4 5.5 5.6 5.7		
	11 14	6. 6.1 6.2 6.3 6.4 6.5 6.6	8	/
	15 16	7.	4	PPT
* English Syllabus	Week	Content	Hours	Format
	1 3	1. Fundamentals on Material Strength and Fracture 1.1 Theoretical cleavage strength 1.2 Theoretical shear strength 1.3 Stress concentration (Inglis Theory) 1.4 Griffith Theory 1.5 Ductile fracture 1.6 Brittle fracture 1.7 Fracture toughness 1.8 Ductile to Brittle transformation	6	Online/das s teaching
	4 5	2. Techniques to measure the strength and fracture toughness 2.1 Strength testing 2.2 Fracture toughness testing 2.3 Indentation fracture theory 2.4 Factors affecting the strength and fracture toughness 2.5 Failure statistics and Weibull Distribution 2.6 Examples	4	Online/das s teaching
	6 7	3. Fracture and Toughening 3.1 Nucleation and formation of cracks 3.2 Fractography 3.3 Toughening mechanism 3.4 Phase transformation toughening 3.5 Composite Materials 3.6 Eshelby theory 3.7 Engineering design 3.8 Size effect in strength testing	4	Online/das s teaching
	8	Course Tutoring/Quiz	2	/
	9 10	4. Creep and Fatigue 4.1 Plastic deformation 4.2 Dislocation density 4.3 Strengthen mechanism 4.4 Creep 4.5 Fatigue 4.6 Stress corrosion	4	Online/das s teaching

