Mechanical Behaviour of Materials

Syllabus

Prof. Dr.-Ing. Jui-Chao Kuo

Course Goals

To understand:

- PI. Fundaments of materials mechanics
- PII. Crystal Plasticity
- PIII. Material Strengthening mechanisms
- PIV. Fracture and Creep of metals

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Content

Ch01-1	Stress and strain tensor	(1/3 week)	
Ch01-2	Elastic constant	(4/3 week)	
Ch01-3	Hardness test	(2/3 week)	3W
Ch02-1	Plastic deformation: Yielding	(2/3 week)	
Ch02-2	Plastic deformation: Slip	(4/3 week)	
Ch02-3	Plastic deformation: Twin	(4/3 week)	4W
Ch03-1	Basics of Dislocations	(3/3 week)	
Ch03-2	Mechanics of Dislocations	(3/3 week)	
Ch03-3	Strengthening	(5/3 week)	4W
Ch04-1	Fracture Morphology	(2/3 week)	
Ch04-2	Fracture Mechanisms	(4/3 week)	
Ch04-3	Creep Mechanisms	(3/3 week)	
Ch04-4	Fatigue Mechanisms	(3/3 week)	4W

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Part I: Ch01-Ch02.1

Week: 1～5

First exam.: at 6. week 13/10

Part II:
Ch02.2-Ch03.2

Week: 7～10

Second exam.: at 11. week 17/11

Part III:
Ch03.3-Ch04.4

Week: 12～16

Third exam.: at 17. week 29/12

Grading

1st exam.: 30%

2nd exam.: 30%

3rd exam.: 40%

References

1. T.H. Courtney, Mechanical Behavior of Materials, McGraw-Hill, 2nd edition, 2013.
2. M. A. Meyers, K.K. Chawla. Mechanical Behavior of Materials, Cambridge University Press; 2nd edition, 2009.
3. J.F. Nye. Physical Properties of Crystals, Oxford University Press, 1972.
4. D. Hull and D.J. Bacon. Introduction to Dislocations, third edition, 1984.
5. M.N. Shetty. Dislocations and Mechanical Behaviour of Materials. PHI Learning Limited, 2013.
6. A. Kelly, G.W. Groves and P. Kidd, Crystallography and Crystal Defects, John Wiley & Sons, New York, 2000.