GD3103
Introduction on Materials and Mechanics of Materials
Summer 2021
Course Syllabus

Lecture:

Date	Taipei Time	Instructor
8/9 (Mon)	1:00 pm – 3:50pm (3hr)	Prof. Mizutani
8/11 (Wed)	1:00 pm – 3:50pm (3hr)	Prof. Mizutani
8/12 (Thu)	8:00 am – 10:50am (3hr)	Prof. Kishimoto
8/13 (Fri)	4:00 pm – 6:50pm (3hr)	Prof. Kishimoto
8/16 (Mon)	4:00 pm – 6:50pm(3hr)	Prof. Kishimoto
8/17 (Tue)	1:00 pm – 3:50pm (3hr)	Prof. Liu
8/18 (Wed)	1:00 pm – 3:50pm (3hr)	Prof. Liu
8/19 (Thu)	1:00 pm – 3:50pm (3hr)	Prof. Mizutani
8/20 (Fri)	1:00 pm – 3:50pm (3hr)	Prof. Liu
8/23 (Mon)	1:00 pm – 3:50pm (3hr)	Prof. Tsai
8/24 (Tue)	1:00 pm – 3:50pm (3hr)	Prof. Tsai
8/25 (Wed)	1:00 pm – 3:50pm (3hr)	Prof. Tsai

Classroom: Online Course

Instructor Information:

Prof. Kikuo Kishimoto Email: kkishimoto@mail.ntust.edu.tw
Prof. Yoshihiro Mizutani Email: ymizutan@mes.titech.ac.jp
Prof. Meng-Lin Tsai Email: mltsai@gapps.ntust.edu.tw
Prof. Meng-Kun Liu Email: mkliu@mail.ntust.edu.tw

Suggested Textbook:

This course will be taught by using the lecture notes.

Useful References:

- F. P. Beer et al, *Mechanics of Material*, 7th edition, McGraw-Hill, 2014
- J. M. Gere and B. J. Goodno, *Mechanics of Material*, 8th edition, Cengage Learning, 2013.
- J. R. Barber, *Intermediate Mechanics of Materials, 2nd edition,* Springer, 2011.
- W. D. Callister Jr. and D. G. Rethwisch, *Callister's Materials Science and Engineering,* Global edition based on the 10th edition, Wiley, 2020.

Description:

This course gives an overview of material and the mechanics of material. The basic concept of materials, structure under loadings, transformation of stress and strain, combined loading and combined stress, deflection of beams and stability of columns will be introduced along with case studies.

Grading:

Each professor will grade your performances on a scale of 0 – 100 points, and a questionnaire of 20 points will be given to you on the last day of the summer section. The summation of this points then divided by four will be your final grade.

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Major Topics:

1. Fundamentals of Mechanics of Materials (Prof. Mizutani, 6 hr)
   - Fundamentals of Mechanics of Materials
   - Introduction, Objective of learning, Types of external force
   - Tension & compression & shear, free body diagram, Internal force, Stress and strain, Mechanical properties
   - Safety factor, Allowable stress
   - Axially loaded members
   - Torsion of shaft
2. Basics of Materials and Design (Prof. Kishimoto, 9 hr)
   - Design of Structure, Material Property Charts
   - Material Process, Materials Selection -Basis
   - Case Studies, Materials and the Environment
3. Fundamentals of Engineering Design Method (Prof. Liu, 9 hr)
   - Introduction to Mechanical Engineering Design
   - Reliability Method and Probability of Failure
   - Deflection of Beams and Buckling
   - Engineering Design Methods and Case Study
4. Applications and Advanced Design (Prof. Mizutani, 3 hr)
   - Mohr's circle
   - Spherical and Cylindrical pressure vessels
   - Case Studies
5. Complex Problems, Materials Strengthening and Failure (Prof. Tsai, 9 hr)
   - Combined Loading
   - Dislocations and Strengthening Mechanisms
   - Failure