

Subject (English)	Mechanics of Materials I		Semester	Fall* Quarter Subject	Day/Slot	Mon. / 3 rd 13:00-14:30 Thu. / 3 rd 13:00-14:30
科目名 (日本語)	材料力学 I					
Course Code	TB14075	Course Numbering	TMA-MEE215		Period	Oct. 3, 2019 – Nov. 25, 2019*
Instructor (Post)	Hideo Miura (Prof.)		*This is a Quarter Subject . Make sure not to conflict with other courses.		Campus	Aobayama
					Building	Mechanical Engineering Research Bld. No. 2
Faculty	School of Engineering		Credits	2	Class Room	2-214 (2 nd floor)
Class subject	Mechanics of Materials					
Object and summary of class						
Mechanics of materials is a branch of applied mechanics that deals with the basic deformation behavior of solid bodies subjected to various types of loading. The knowledge of the mechanical stress and strain set up within the bodies and resulting deflection is a prerequisite for the structural design of industrial products and infrastructures such as buildings, roads, and bridges. This course is intended as an introductory course in the mechanics of solids offered to engineering students. It concentrates on developing analysis techniques from principle for a range of practical problems that include simple structures, pressure vessels, beams and shafts. This course is one quarter course (twice a week).						
Keywords	Force Balance, Stress, Strain, Elastic Deformation, Solid, Torsion					
Goal of study						
Students will come to understand how to evaluate two-dimensional stress and strain fields in a solid structure quantitatively.						
Contents and progress schedule of class						
The topics covered in this course are Hooke's law, and stress-strain diagram, strength and stiffness, tension, compression and shear, combined stresses, torsion of a bar.						
No.	Date	Contents				
1	10/3	Chap. 1: Introduction: Force balance and deformation of solid materials				
2	10/5	Chap. 1: Repulsion force and bending moment, concept of stress and strain				
3	10/7	Chap. 1: Stress-strain curve, Hooke's law, Mechanical properties of materials				
4	10/10	Chap. 2: Truss structure (Two-dimensional force balance)				
5	10/14	Chap. 2: Thermal stress				
6	10/17	Chap. 2: Residual Stress, Stress Concentration, hoop stress				
7	10/21	Summary of Chap. 1 and Chap. 2				
8	10/24	Mid-term exam. 1				
9	10/28	Chap. 3: Combined stress, membrane stress				
10	10/31	Chap. 3: Principal stresses and Mohr's circle				
11	11/7	Chap. 3: Two-dimensional stress and strain field (Poisson's ratio),				
12	11/11	Chap. 4: Torsion of a bar -1 (twisting moment, polar moment of inertia of area)				
13	11/14	Chap. 4: Torsion of a bar -2 (Torsional stress, specific angle of twist, torsional rigidity)				
14	11/18	Mid-term exam. 2				
15	11/21	Summary of Mechanics of Materials I				
Preparation	It is assumed that the students have some experience in elementary physics (mechanics of rigid bodies) and mathematics (differentiation and integration).					
Record and evaluation method	The students' performance will be evaluated by considering the results of homework and examinations. Grades of the courses will be assigned as follows; AA = Excellent (90-100%) / A = Good (80-89%) / B = Fair (70-79%) / C = Passing (60-69%) / D = Failure (0-59%)					
Textbook and references	1) S. Timoshenko and D. H. Young, "Elements of Strength of Materials," Van Nostrand Reinhold Company (1968), 2) W. Nash and M. Potter, "Strength of Materials, 5th Edition", McGrawhill, (2011).					
Self study	After the presentation of the underlying theory for each topic, the students will be provided with problems for homework to aid the understanding of the principles.					
In addition	Contact e-mail: hmiura@rift.mech.tohoku.ac.jp					