

Elective Course Description (1. Fall Semester)

Subject (English)	Mechanics of Materials		Semester	Fall/Q* *Quarter Subject	Day/Slot	
科目名 (日本語)	材料力学					
Course Code		Course Numbering	TMA-MEE215		Period	Oct. – Dec. (Quarter)
Instructor (Post)	Prof. Hideo Miura			Campus		
				Building		
Faculty	Department of Mechanical and Aerospace Engineering		Credits	2	Class Room	
Class subject						
Object and summary of class						
<p>Mechanics of materials is a branch of applied mechanics that deals with the basic behavior of solid bodies subjected to various types of loading. The knowledge of the 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.</p> <p>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 semester course. The topics covered in this course are listed in the syllabus as is shown below.</p>						
Keywords	Mechanics: Deformation, Mechanical stress, Strain, External force and moment					
Goal of study						
To learn the theory and quantitative method for analyzing deformation and stress-strain field in the deformed structure under the application of external forces						
Contents and progress schedule of class						
<ol style="list-style-type: none"> 1. Introduction (1) : Modeling of engineering systems and concepts of stress and strain 2. Introduction (2) : Hooke's law, and stress-strain diagram, strength and stiffness 3. Tension, compression and shear (1) : Pin-jointed structures and statically indeterminate problems 4. Tension, compression and shear (2) : Thermal stress and residual stresses, thin rings, and stress concentration 5. Mid-term examination-1 6. Combined stresses (1) : Biaxial tension, normal stress and shear stress, plane stress 7. Combined stress (2) : Stress-strain relations 8. Torsion (1) : Torsion of circular shafts, and closecoiled helical spring 9. Torsion (2) : Shaft of rectangular or profile section and thin-walled tube of arbitrary cross section 10. Mid-term examination-2 11. Shearing force and bending moment in a beam: Type of supports for beams and reactions, type of loads on a beam 12. Stress in a beam 13. Deflection in a beam 14. Statically indeterminate beam 15. Final examination 						
Preparation	Mathematics: Linear algebra and differential equation					
Record and evaluation method	Homework is assigned in each lecture. The personal grade is evaluated by the summation of the record of each homework and examination.					
Textbook and references	Reference materials are distributed in the class.					
Self study	Homework and prep review of distributed materials and lectures					
In addition	This course is an introduction of Mechanics of Materials for beginners. Experienced person should take another course held in IMAC-U course in the department of mechanical and aerospace engineering (Mechanics of Materials I and II, or Fracture Mechanics, or Strength of Materials)					