Subject (科目名)	Mechanics of Materials (材料力学)	Credits	2	Day/Slot	Wed. / 1st 8:50 – 10:20
Course Code	VJ231F81	Semester	Fall	Period	Oct. 4, 2017 - Jan. 24, 2018
Instructor (Post)	Hideo Miura, Kazuhisa Sato, Go Yamamoto (Prof.) (Assoc. Prof.) (Assoc. Prof.)			Campus	Kawauchi Campus
				Building	International Exchange Building
Faculty	Faculty of Engineering			Class Room	R115

Class subject	Mechanics of Materials

Object and summary of class

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. 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.

Keywords	-

Goal of study

Students will come to understand how to evaluate two-dimensinal 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, shearing force and bending moment in a beam, stress and deflection of a beam, and statically indeterminate beam.

Oct. 4	Prof. Miura	Introduction (1): Modeling of engineering systems and concepts of stress and strain
Oct. 11	Prof. Miura	Introduction (2): Hooke's law, and stress-strain diagram, strength and stiffness
Oct. 18	Prof. Miura	Tension, compression and shear (1): Pin-jointed structures and statically indeterminate problems
Oct. 25	Prof. Miura	Tension, compression and shear (2): Thermal stress and residual stresses, thin rings, and stress concentration
Nov. 1	Prof. Miura	Mid-term examination (1)
Nov. 8	Assoc. Prof. Sato	Combined stresses (1): Biaxial tension, normal stress and shear stress, plane stress
Nov. 15	Assoc. Prof. Sato	Combined stress (2): Stress-strain relations
Nov. 22	Assoc. Prof. Sato	Torsion (1): Torsion of circular shafts, and close-coiled helical spring
Nov. 29	Assoc. Prof. Sato	Torsion (2): Shaft of rectangular or profile section and thin-walled tube of arbitrary cross section
Dec. 6	Assoc. Prof. Sato	Mid-term examination (2)
Dec. 13	Assoc. Prof. Yamamoto	Shearing force and bending moment in a beam: Type of supports for beams and reactions, type of loads on a beam
Dec. 20	Assoc. Prof. Yamamoto	Stress in a beam
Jan. 10	Assoc. Prof. Yamamoto	Deflection of a beam
Jan. 17	Assoc. Prof. Yamamoto	Statically indeterminate beam
Jan. 24	Assoc. Prof. Yamamoto	Final examination

Preparation	It is assumed that the students have some experience in elementary statics (mechanics of rigid bodies) and mathematics (such as 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.
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