Akashi College	Year	2022	Course Title	Soil and Foundation Mechanics

Course Information

Course Code	4513	Course Category	Specialized / Compulsory
Class Format	Lecture	Credits	Academic Credit: 2
Department	Architecture	Student Grade	5th
Term	Second Semester	Classes per Week	2
Textbook and/or Teaching Materials			
Instructor	NAKAO Yuuki		

Course Objectives

(1) To understand the relationship between foundation and ground, and the role of ground characteristics and foundation structure.
(2)To understand the soil composition and its relation with underground water
(3) To understand ground stress.
(4) To understand basic types of foundation and their change.
(5) To understand the design of the spread foundation. To calculate the ground bearing capacity and the amount of settlement.
(6) To understand the classification, design and construction method of pile foundation.
(7) To understand the design of a retaining wall.

Rubric

	Excellent	Good	Insufficient
Achievement 1	The student can perfectly understands the relationship between foundation and ground, and the role of ground characteristics and foundation structure.	The student can the relationship between foundation and ground, and the role of ground characteristics and foundation structure.	The student can not the relationship between foundation and ground, and the role of ground characteristics and foundation structure.
Achievement 2	The student can well soil composition and its relation with underground water.	The student can soil composition and its relation with underground water.	The student can not soil composition and its relation with underground water.
Achievement 3	The student well understands ground stress.	The student understands ground stress.	The student doesn't understand ground stress.
Achievement 4	The student can well explain the basic types of foundation and their change.	The student can the basic types of foundation and their change.	The student can not explain the basic types of foundation and their change.
Achievement 5	The student can well understand the design of the direct foundation. To calculate the ground bearing capacity and the amount of settlement.	The student can understand the design of the direct foundation. To calculate the ground bearing capacity and the amount of settlement.	The student can not understand the design of the direct foundation. To calculate the ground bearing capacity and the amount of settlement.
Achievement 6	The student can well understand the classification, design and construction method of pile foundation.	The student can understand the classification, design and construction method of pile foundation.	The student can not understand the classification, design and construction method of pile foundation.
Achievement 7	The student can well understand the design of a retaining wall.	The student can understand the design of a retaining wall.	The student can not understand the design of a retaining wall.

Assigned Department Objectives

Teaching Method

Outline	The foundations of a building are constructed on the ground. The upper part of the Building Structure is designed to safely bear the necessary amount of load, and the foundation has the important function of transferring this load to the ground. In this course, we will discuss the basic knowledge about several types of building foundations, such a spread foundation pile foundation and what are the important points to be considered when designing a building foundation.
Style	The classes are on the lecture-style lecture, exercises and assignment will be executed as appropriate.
Notice	This course requires 90 hours of self-study time to do preliminary reviews, reviews, and assignments. Students attendance is required, and only a maximum of 5 absences is excused.

Characteristics of Class / Division in Learning

☑ Active Learning	☐ Aided by ICT	☑ Applicable to Remote Class	☐ Instructor Professionally Experienced

Course Plan

			Theme	Goals
2nd Semester	3rd Quarter	1st	Foundation structures and ground The relation between foundation structures and ground properties, lecture on its types and characteristics. Explanation of the building load and the ground stress transfer mechanism.	To understand the relationship between foundation and ground, and the role of ground characteristics and foundation structure.
		2nd	Soil basic properties and groundwater Soil composition, types of soil and their characteristics types of groundwater and its relation with soil composition.	To understand the soil composition and its relation with underground water.
		3rd	Ground inner the stress, compression, and consolidation, shear strength Effective stress, pore water pressure, stresses in the ground etc.	To understand ground stress.

		4th	Ground inner stress, mechanical property, and experimental methods Internal friction angle and cohesion of sandy soil and cohesive soil	To understand ground stress.
		5th	Ground inner stress and earth pressure Active earth pressure, earth pressure at rest and passive earth pressure.	To understand ground stress.
		6th	Soil investigation and Soil improvement Types and the objectives of soil investigation. Objectives of soil improvement: settlement, liquefaction etc.	To understand soil investigation and soil improvement
		7th	Changes on foundations format and exercises Explain changes of foundation format, from the traditional Japanese foundation to the modern residential foundation. Exercises on the physical and mechanical properties of soil and ground.	To understand basic types of foundation and their change.
		8th	Mid-term Exam	
	4th Quarter	9th	Spread foundation design part 1 Principals of Spread foundation design.	To understand the design of the spread foundation. To calculate the ground bearing capacity and the amount of settlement.
		10th	Spread foundation design part 2 Lecture on ground bearing capacity and how to calculate it.	To understand the design of the spread foundation. To calculate the ground bearing capacity and the amount of settlement.
		11th	Spread foundation design part 3 Lecture on the ground settlement.	To understand the design of the spread foundation. To calculate the ground bearing capacity and the amount of settlement.
		12th	Pile foundation design part 1 Different types of pile and construction execution method	To understand the classification, design and construction method of pile foundation.
		13th	Pile foundation design part 2 Lecture on pile foundation design.	To understand the classification, design and construction method of pile foundation.
		14th	Retaining wall design Lecture on retaining wall design.	To understand the design of a retaining wall.
		15th	Building Standard Law regarding foundation structures and ground Lecture on the enforcement ordinance 38 and notification. Spread foundation and pile foundation design exercise.	To design a spread foundation and pile foundation.
		16th	End-term Exam	

Evaluation Method and Weight (%)

	Examination	Assignments	Total
Subtotal	50	50	100
Basic Proficiency	0	0	0
Specialized Proficiency	50	50	100
Cross Area Proficiency	0	0	0