Akashi College	Year	2024	Course Title	Reinforced Concrete Structures A

Course Information

Course Code	6423	Course Category	Specialized / Compulsory
Class Format	Lecture	Credits	School Credit: 1
Department	Architecture	Student Grade	4th
Term	First Semester	Classes per Week	2
Textbook and/or Teaching Materials	槇谷栄次:「鉄筋コンクリート構造の設計」、森北出版日本建築学会:「鉄筋コンクリート構造計算規準・同解説」、日本建築学会		
Instructor	KAKUNO Yoshinori		

Course Objectives

"(1) To understand the mechanical characteristics of rectangular section.
(2) To make a section designs of beams and columns based on materials' allowable stress (to calculate the main reinforcement and shear reinforcement)."

Rubric

	Ideal Level	Standard Level	Unacceptable Level
Achievement 1	Fully understand the mechanical properties of beams and columns.	Understand the mechanical properties of beams and columns.	Doesn't understand the mechanical properties of beams or columns.
Achievement 2	Can fully understand and make the design of a cross section for beams and pillars.	Can understand and make the design of a cross section for beams and pillars.	Can not understand or make the design of a cross section for beams and pillars.

Assigned Department Objectives

Teaching Method

Outline	In this course, students will learn the material characteristics of concrete and reinforced steel, and learn the design methods based on allowable stress. Focuses will be placed on beams under flexure which are the main structural part of buildings, the mechanical characteristics of beams under flexure and axial tension, and section design methods. Students will also learn about the design methods for shear reinforcement for securing the resilience against shear stress of beams and columns.
Style	The course is lecture style.
Notice	Students are expected to understand the material characteristics of concrete and reinforced steel and to apply these knowledge into the section design of different parts. The students should always bring their calculators and use it during the class. The students should preview and review the content studied using e-learning and working on peer instructions. The content of this course has a total of 90 hours, and includes self-learning to the study time given during classes, previews, reviews, and assigned reports. 5 absences will be excused.

Characteristics of Class / Division in Learning

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

Course Plan

			Theme	Goals
1st Semester	1st Quarter	1st	Introduction Lecture on the history of Reinforced concrete. Advantages and disadvantages of reinforced concrete structures and composite structures.	To understand the history of reinforced concrete, its strengths, and weaknesses.
		2nd	Material and the allowable stress -1 Lecture on the characteristics of the concrete and rebar.	To understand the material properties and the allowable stress level of concrete and rebar.
		3rd	Material and the allowable stress -2 Lecture on the allowable stress of concrete and rebar.	To understand the material properties and the allowable stress level of concrete and rebar.
		4th	Beam subjected to bending -1 Lecture on the mechanical properties of the reinforced beam.	To understand the neutral axis position of the single beam, the stress on each part of the beam, and the balanced cross section.
		5th	Beam subjected to bending -2 Lecture on maximum bending moment and allowable bending moment of a reinforced beam cross-section.	To understand the design of the cross section of a single beam.
		6th	Beam subjected to bending -3 Lecture on the mechanical properties of the multi-muscle beams.	To understand the neutral axis position of the double-stranded beam, the stress on each part of the beam, and the balanced cross section.
		7th	Beam subjected to bending -4 Lecture on allowable stress design of the double rebar beam section.	To understand the neutral axis position of the double-stranded beam, the stress on each part of the beam, and the balanced cross section.
		8th	Mid-term Exam	
	2nd Quarter	9th	Subjected to bending and axial force-1 Lecture on the mechanical properties of the column cross-section.	To understand the neutral axial position of column cross section, the stress on each part, and the balanced cross section
		10th	Subjected to bending and axial force -2 Lecture on the mechanical properties of the column cross-section.	To understand the neutral axial position of column cross section, the stress on each part, and the balanced cross section
		11th	Subjected to bending and axial force -3 Lecture on the allowed axial force of the pillars and the allowable bending moment.	To understand the allowable axial force and the allowable bending moment of the cross section of the column.

		12th	Subjected to bending and axial force -4 Lecture on the allowable stress design of the column cross-section.	To understand the calculation chart of the cross section of the column. Also, to calculate, using the sectional map, the section of the main reinforcement.
		13th	Shear reinforcing -1 Lecture on the beam section shear stress distribution and the allowable shear power.	To understand the purpose and significance of the shear reinforcement, and the shearing force exerted in the concrete and the reinforcement steel.
		14th	Shear reinforcing -2 Lecture on the shear reinforcement design of the beam.	Understand shear forces and allowable shear forces of beams and can calculate the stirrup.
		15th	Shear reinforcing -3 Lecture on the shear reinforcement design of the pillar.	To understand shear force and permissible shear force in the design of a pillar, and calculate hoops.
		16th	End-term Exam	

Evaluation Method and Weight (%)

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