

Akashi College		Year	2022	Course Title	Exercises in Structural Design
Course Information					
Course Code	4523		Course Category	Specialized / Elective	
Class Format	Seminar		Credits	Academic Credit: 2	
Department	Architecture		Student Grade	5th	
Term	Second Semester		Classes per Week	2	
Textbook and/or Teaching Materials	日本建築学会:「鉄筋コンクリート構造計算規準・同解説」、高梨晃一ほか：基礎からの鉄骨構造 第2版（森北出版）				
Instructor	NAKAGAWA Hajime				
Course Objectives					
(1) To deepen the understanding of architectural structure mechanics, reinforced concrete structure, steel structure, foundations of seismic engineering and earthquake engineering, building production (temporary construction, earthwork, framework) through the solution of exercises. (2) To execute a structural calculation and structural drawings of small-scale buildings, using the knowledge acquired at the 4th year courses of reinforced concrete structures and steel structures.					
Rubric					
	Excellent		Good		Insufficient
Achievement 1	The student understands and can well execute exercises on building structures, materials, and architectural production.		The student understands and can execute exercises on building structures, materials, and architectural production.		The student doesn't understand and can not execute exercises on building structures, materials, and architectural production.
Achievement 2	The student can correctly do the structural calculation, and structural drawings of small-scale buildings, and can fully explain his/her design.		The student can do the structural calculation, and structural drawings of small-scale buildings, and can explain his/her design.		The student can not do the structural calculation, and structural drawings of small-scale buildings, and can not explain his/her design.
Assigned Department Objectives					
Teaching Method					
Outline	During the first seven weeks, the students will practice building structural mechanics (including plastic mechanics), RC / S construction, structural planning/loading, seismic design, and construction production. In the last seven weeks, the students will choose between a reinforced concrete structure or a steel frame structure, and in groups work in the design of a three-story office building, using commercially available structural software. The instructor worked as a designer at an architectural structure company and has experience on structural design of small-scale buildings.				
Style	The course is conducted on the execution of exercises, with lectures as appropriate. In the first weeks, the students will execute assignments to prepare for the structural design assignment. From the 9th week, the students will work in groups and execute the structural calculation and the structural drawings of small-scale buildings. This course requires self-study, and that will be reported later.				
Notice	This course requires 90 hours of self-study time to do preliminary reviews, reviews, and assignments. To review the content learned at the 4th year courses of reinforced concrete structures and steel structures, and the 5th year Special Problems in Structural Theory and Design A. To work in a group with an independent and cooperative attitude. Students attendance is required, and only a maximum of 5 absences is excused.				
Characteristics of Class / Division in Learning					
<input type="checkbox"/> Active Learning		<input type="checkbox"/> Aided by ICT		<input checked="" type="checkbox"/> Applicable to Remote Class	<input checked="" type="checkbox"/> Instructor Professionally Experienced
Course Plan					
			Theme	Goals	
2nd Semester r	3rd Quarter	1st	Course schedule and description	To understand the contents to be learned in this subject.	
		2nd	Architectural structure exercises (1) static beam and static frame structure To solve problems on static structures	Through the exercises understand the contents of the second week.	
		3rd	Architectural structure exercises (2) statically indeterminate structures, structural plans and loads, seismic design To solve problems on statically indeterminate structures, structural plans and loads, and seismic design.	Through the exercises understand the contents of the third week.	
		4th	Architectural structure exercises (3) reinforced concrete structures To solve problems on the material properties of concrete and rebar.	Through the exercises understand the contents of the fourth week.	
		5th	Architectural structure exercises (4) Steel structure To solve problems on high strength bolts, welding, structural elements and joints.	Through the exercises understand the contents of the fifth week.	
		6th	Architectural structure exercises (5) Architecture production To solve problems on temporary work, earthworks, and foundation work.	Through the exercises understand the contents of the sixth week.	
		7th	Architectural structure exercises (6) Architecture production To solve problems on formwork, rebar, concrete, steelwork.	Through the exercises understand the contents of the seventh week.	
		8th	Mid-term Exam		

4th Quarter	9th	Outline of the structural design for an RC / S 3-story office building	To fully understand the procedure for designing the structure of a small office building.
	10th	Structural design (1) To calculate the structural plan, calculation of secondary parts (small beams, slabs).	To make structural drawings from the design drawings. To calculate the assumed cross sections of structural members (columns, beams) and beams and slabs.
	11th	Structural design (2) To input data required for structural calculation in the commercially available structural software.	To enter data, structural frame, load, design conditions, etc without mistake.
	12th	Structural design (3) To input data required for structural calculation in the commercially available structural software.	To enter data, structural frame, load, design conditions, etc without mistake.
	13th	Structural design (4) To input data required for structural calculation in the commercially available structural software.	To enter data, structural frame, load, design conditions, etc without mistake.
	14th	Structural design (5) To calculate the structure and make the structural drawings.	To calculate the structure and make the structural drawings (beam down view, shaft set up, steel frame detail view).
	15th	Structural design (5) To calculate the structure and make the structural drawings.	To calculate the structure and make the structural drawings (beam down view, shaft set up, steel frame detail view).
	16th	No End-term Exam	

#### Evaluation Method and Weight (%)

	Participation	Assignments	Total
Subtotal	30	70	100
Basic Proficiency	0	0	0
Specialized Proficiency	30	70	100
Cross Area Proficiency	0	0	0