

Akashi College		Year	2020	Course Title	Special Problems in Structural Theory and Design B
Course Information					
Course Code	0110		Course Category	Specialized / Elective	
Class Format	Lecture		Credits	School Credit: 1	
Department	Architecture		Student Grade	5th	
Term	Second Semester		Classes per Week	2	
Textbook and/or Teaching Materials	Hand outs (参考図書)杉山英男:木質構造、共立出版(Shojo)、PC設計施工規準・同解説、建築学会(Ichizawa)				
Instructor	SHOJO Naoya,ICHISAWA Yuhiko				
Course Objectives					
(1) Historical review of earthquake damage in timber construction, earthquake resistance diagnosis, and new technologies. (2) The types and structure formats of timber construction. Material types and its characteristics, and how to can calculate wall quantity and eccentricity. (3) The positioning, design methods, and implementation methods of PC construction in a concrete system structure, and to calculate cross-sectional for simple PC structures.					
Rubric					
	Excellent		Good		Insufficient
Achievement 1	The student can perfectly understand earthquake damage in timber construction, earthquake resistance diagnosis, and new technologies.		The student can earthquake damage in timber construction, earthquake resistance diagnosis, and new technologies.		The student can not earthquake damage in timber construction, earthquake resistance diagnosis, and new technologies.
Achievement 2	The student can well understand types and structure formats of timber construction. Material types and its characteristics, and how to can calculate wall quantity and eccentricity.		The student can understand types and structure formats of timber construction. Material types and its characteristics, and how to can calculate wall quantity and eccentricity.		The student can not types and structure formats of timber construction. Material types and its characteristics, and how to can calculate wall quantity and eccentricity.
Achievement 3	The student well understands the positioning, design methods, and implementation methods of PC construction in a concrete system structure, and can calculate the cross-sectional for simple PC structures.		The student understands the positioning, design methods, and implementation methods of PC construction in a concrete system structure, and can calculate the cross-sectional for simple PC structures.		The student doesn'tthe positioning, design methods, and implementation methods of PC construction in a concrete system structure, and can calculate the cross-sectional for simple PC structures.
Assigned Department Objectives					
学習・教育到達度目標 (D) 学習・教育到達度目標 (F) 学習・教育到達度目標 (H)					
Teaching Method					
Outline	The first half of the semester (Shojo 8 weeks) covers the basic knowledge relating to materials and timber construction. The latter half of the second semester (Ichizawa 7 weeks) includes the fundamental thinking, design methods, and implementation methods of pre-stressed concrete structures (PC structure) applied to reinforced concrete structures, with field trips and visit construction sites. From the 9th week, the instructor (Ichizawa) is in charge of the structural design of the PC structure in a company, and making use of their experiences will inform the students in the form of lectures on the latest the structural design methods.				
Style	The course is conducted with lectures and exercises and uses handouts and slides. Assignments will be requested as appropriate. It is an omnibus course, and Shojo will be in charge until the eighth week, and Ichizawa will be in charge after the ninth week.				
Notice	The course requires fundamental knowledge in architectural building dynamics, reinforced concrete structures, and steel structures from year 4th and below, the students should sufficiently revise these topics. Students attendance is required, and only a maximum of 5 absences is excused.				
Course Plan					
			Theme	Goals	
2nd Semester	3rd Quarter	1st	Timber structures earthquake damages and meaning of utilizing timber structures Describes timber structures past earthquake damage. The significance of utilizing timber structure. Problems of the changes in Building Standards Law for timber structure.	To understand earthquake damage in timber construction and the significance of utilizing timber structure.	
		2nd	Different types and characteristics of Timber Structures There are several types of timber structures (timber framework method, Balloon Framing, etc.) Lecture on timber structure types and their characteristics.	To understand timber structure types and their characteristics.	
		3rd	Timber Structure Materials Lecture on the different materials used in timber structure and the main characteristic of each material.	To understand timber structure materials and their characteristic.	
		4th	Timber structure planning and structural design method Timber structures distribution of load and the function of each structural element. Essential points of vertical load and horizontal load to consider when designing a timber structure.	To understand the flow of force on a wood structure, and the points to consider in the design of the structure.	

		5th	Calculation of Wall amount Method of calculating the wall amount most used in the design of a single-story and two-story timber structure house.	To understand the preconditions of a wall volume calculation and to calculate the wall volume.
		6th	Eccentricity calculation How to calculate the eccentricity generated by the balanced disposition of structural walls, 4 division method of simplified eccentricity calculation.	To calculate eccentricity.
		7th	Present and future of timber structures Current situation and the prospects of timber structure, challenges such as earthquake-resistant diagnosis of a timber structure.	To understand the current situation of timber structures and to form an opinion about the future of timber structures.
		8th	Mid-term Exam	
	4th Quarter	9th	History of Pre-stress concrete (PC) structure and introduce of PC structural buildings History and the use of the PC structure. The latest design example of PC buildings presented with slides.	To understand the PC structure history and be able to explain examples of PC structures.
		10th	Principles, characteristics of PC structure and tensioning method of pre-stress force Basic principles of PC structure. The merit of PC structure and how to put concrete into pre-stress.	To understand the basic principles of PC structure.
		11th	About kinds, characteristics, fixation method of steel materials used for PC structure The types and material properties of steel materials (PC steel materials) used in PC structure. The fixing process and the prestressing force.	To understand the type, characteristics and fixing method of steel materials used for PC structure.
		12th	The allowable stress level of concrete and the cross-sectional stress level generated. Types of concrete used in PC structures, and the allowable stress level applied to the design and the actual cross-sectional stress level.	To understand the allowable stress level of concrete and the actual cross-sectional stress level.
		13th	Structural design exercise of PC elements To conduct structural design exercises for PC elements. To understand the basic structural design of PC structures. Describe the flow of a structural design of a simple PC member.	To understand the basic steps of structural design of a PC structure, and design simple PC elements.
		14th	Relationship between PC structure / PRC structure / RC structure-and indeterminate secondary stress To compare and understand the structural features of the PC structure/ PRC structure/ RC structure. The stress peculiar to the PC structure generated when the prestressing force is introduced to the statically indeterminate structure.	To understand the static secondary stress inherent to the PC structure. TO compare and understand the structural features of the PC structure/ PRC structure/ RC structure.
		15th	Prestress Loss and Effectiveness Rate To understand why as time passes the prestressing force introduced into concrete diminishes. To know how to apply the loss of prestressing force during structural design.	Prestress Loss and Effectiveness Rate To understand the loss of the prestressing force and the effectiveness rate.
		16th	End-term Exam	

#### Evaluation Method and Weight (%)

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