

Akashi College		Year	2024		Course Title	Structural Analysis ⅢA	
Course Information							
Course Code		6419		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		中川肇「基礎から学ぶ」建築構造力学 理論と演習からのアプ <sup>ロ</sup> ーチ」((株)井上書院)を使用する。(参考図書)鈴木基行者:構造力学徹底演習、森北出版					
Instructor		KAKUNO Yoshinori					
Course Objectives							
(1) To calculate the deformation and stress of a statically indeterminate structures (Beam, Rigid frame, Truss structure) using the principle of virtual work. (2) To calculate the stress of a statically indeterminate beam using the principle of virtual work. To be able to draw the graph of the stress of a statically indeterminate beam.							
Rubric							
		Ideal Level		Standard Level		Unacceptable Level	
Achievement 1		Can well explain the principles of virtual work and energy.		Can explain the principles of virtual work and energy.		Can not explain the principles of virtual work and energy.	
Achievement 2		Can well use the principles of virtual work and energy to calculate the fulcrum reaction force, stress (graph), deformation (deflection, deflection angle) of a structure (beam, rigid frame, truss, etc.)		Can use the principles of virtual work and energy to calculate the fulcrum reaction force, stress (graph), deformation (deflection, deflection angle) of a structure (beam, rigid frame, truss, etc.)		Can not use the principles of virtual work and energy and can not calculate the fulcrum reaction force, stress (graph), deformation (deflection, deflection angle) of a structure (beam, rigid frame, truss, etc.)	
Achievement 3		Can well calculate the fulcrum reaction force of a statically indeterminate structure using principles for statically indeterminate structure, such as the virtual work method.		Can calculate the fulcrum reaction force of a statically indeterminate structure using principles for statically indeterminate structure, such as the virtual work method.		Can not calculate the fulcrum reaction force of a statically indeterminate structure using principles for statically indeterminate structure, such as the virtual work method.	
Assigned Department Objectives							
Teaching Method							
Outline		Structural analysis is the basis for building structure and structural design. The applied course follows Structural Analysis I (2nd year) and Structural Analysis III (3rd year). The students will learn the mechanical differences between statically determinate and statically indeterminate structures. The students will acquire solving methods for statically indeterminate structures, such as the stress method, and displacement method. Also, the students will gain knowledge of the representative solving methods, for statically indeterminate structures (rigid frame structure), such as the slope deflection method and moment distribution method. As part of the school global education, the tests and exercises are in English.					
Style		Lecture and problem-solving practice using textbook chapters 12 to15.					
Notice		To listen to the lectures and take notes. To solve exercise problems and understand them correctly. The students are supposed to ask questions and make sure they know the content before proceeding in the course. The students should review the topics learned in structural analysis courses I (2nd year) and II (3rd year). 5 absences will be excused.					
Characteristics of Class / Division in Learning							
<input type="checkbox"/> Active Learning		<input type="checkbox"/> Aided by ICT		<input type="checkbox"/> Applicable to Remote Class		<input type="checkbox"/> Instructor Professionally Experienced	
Course Plan							
			Theme		Goals		
1st Semester r	1st Quarter	1st	Stable or unstable, statically or non-statically structure (1) Discusses the differences between stable or unstable, statically or non-statically structures.		To understand the discriminant of a stable or an unstable and statically or non-statically of the structure through a various example model.		
		2nd	Stable or unstable and statically or non-statically structure (2)		To review the content learned at the previews structural analysis courses.		
		3rd	Work and strain energy (1)		To understand the external and internal works of a statically determinate beam.		
		4th	Work and strain energy (2)		To understand the strain energy due to axial force, bending moment and shear force.		
		5th	Work and strain energy (3) Quiz (3) Deformation of a statically determinate beam using the principle of virtual work.		To understand the principles of virtual work and strain energy due to shear force.		
		6th	Work and strain energy (4)		To calculate the deflection of a statically determinate beam using the Castiglano's theorem.		
		7th	Work and strain energy (5) Assignment (2)		To review the content learned		
		8th	Mid-term Exam				
	2nd Quarter	9th	The deflection of statically determinate structure (1)		To understand the deflection of a statically truss using the principle of virtual work.		
		10th	The deflection of statically determinate structure (2)		To understand the deflection of statically rigid frame structure using the principle of virtual work.		

		11th	The deflection of statically determinate structure (3) Assignment (2)	To review the content learned
		12th	Non-statically determinate structure (1)	To understand, through example, the degree of redundancy of non-statically structure, and various kinds of non-statically beams and rigid frame structures.
		13th	Non-statically determinate structure (2)	To execute a stress analysis of non-statically determinate beam using the principle of virtual work.
		14th	Non-statically determinate structure (3)	To calculate, using models, the stress of Non-statically continuous beams.
		15th	Non-statically determinate structure (4) Assignment (4)	To review the content learned
		16th	End-term Exam	

#### Evaluation Method and Weight (%)

	Examination	Assignments	Total
Subtotal	80	20	100
Basic Proficiency	0	0	0
Specialized Proficiency	80	20	100
Cross Area Proficiency	0	0	0