

Akashi College		Year	2022	Course Title	Structural Analysis II B
Course Information					
Course Code	4315		Course Category	Specialized / Compulsory	
Class Format	Lecture		Credits	School Credit: 1	
Department	Architecture		Student Grade	3rd	
Term	Second Semester		Classes per Week	2	
Textbook and/or Teaching Materials					
Instructor	SHOJO Naoya				
Course Objectives					
(1) To understand the relationship between stress and strain generated in the section by axial force and to calculate it. (2) To understand the relationship between stress and strain produced in the section by the bending moment and to calculate it. (3) To understand and calculate the shearing stress distribution in a beam section. (4) To understand and calculate the eccentrically loaded compressed pillar (5) To understand the allowable stress design method and to evaluate the security of a structure. (6) To calculate the deformation of the beam due to axial stress. (7) To calculate the deflection angle of a beam using differential equation and Mohr's theorem. (8) To calculate the deformation of a beam due to shear stress. (9) To calculate Euler's buckling load for various support conditions.					
Rubric					
	Ideal Level		Standard Level		Unacceptable Level
Achievement 1	The student perfectly understands the relationship between stress and strain generated in the section by axial force and can calculate it.		The student understands the relationship between stress and strain generated in the section by axial force and can calculate it.		The student doesn't understand the relationship between stress and strain generated in the section by axial force and can calculate it.
Achievement 2	The student perfectly understands the relationship between stress and strain produced in the section by the bending moment and can calculate it.		The student understands the relationship between stress and strain produced in the section by the bending moment and can calculate it.		The student doesn't understand the relationship between stress and strain produced in the section by the bending moment and can calculate it.
Achievement 3	The student perfectly understands and calculates the shearing stress distribution in a beam section.		The student understands and calculates the shearing stress distribution in a beam section.		To understand and calculate the shearing stress distribution in a beam section.
Achievement 4	The student perfectly understands and calculates the eccentrically loaded compressed pillar.		The student understands and calculates the eccentrically loaded compressed pillar.		The student doesn't understand the eccentrically loaded compressed pillar.
Achievement 5	The student perfectly understands the allowable stress design method and knows how to evaluate the security of a structure.		The student understands the allowable stress design method and knows how to evaluate the security of a structure.		The student doesn't understand the allowable stress design method and doesn't know how to evaluate the security of a structure.
Achievement 6	The student can accurately calculate the deformation of the beam due to axial stress.		The student can calculate the deformation of the beam due to axial stress.		The student can not calculate the deformation of the beam due to axial stress.
Achievement 7	The student can accurately calculate the deflection angle of a beam using differential equation and Mohr's theorem.		The student can calculate the deflection angle of a beam using differential equation and Mohr's theorem.		The student can not calculate the deflection angle of a beam using differential equation and Mohr's theorem.
Achievement 8	The student can accurately calculate the deformation of a beam due to shear stress.		The student can calculate the deformation of a beam due to shear stress.		The student can not calculate the deformation of a beam due to shear stress.
Achievement 9	The student can accurately calculate Euler's buckling load for various support conditions.		The student can calculate Euler's buckling load for various support conditions.		The student can not calculate Euler's buckling load for various support conditions.
Assigned Department Objectives					
Teaching Method					
Outline	As a continuation of the content studied at Structural Analysis IIA, the students will learn about the stress intensity of the section, its application to structural design, and the deformation of structural elements.				
Style	The classes are on the lecture-style lecture, exercises and assignment will be executed as appropriate.				
Notice	To show interest in structural frameworks and mathematics, and to listen carefully to the lectures. It is essential that the students solve the exercises and understand them. To ask questions, and make sure to follow the content learned before moving forward. 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	Section stress intensity(1): axial stress and bending stress	To understand the relationship between stress and strain generated in the section by axial force and to calculate it.	

		2nd	Section stress intensity(2): bending stress	To understand the relationship between stress and strain produced in the section by the bending moment and to calculate it.
		3rd	Section stress intensity(3): shearing stress	To understand and calculate the shearing stress distribution in a beam section.
		4th	Section stress intensity(4): shearing stress generated by axial stress and bending stress	To understand and calculate the eccentrically loaded compressed pillar
		5th	Section stress intensity(5): exercises	To understand the relationship between stress and strain generated in the section by axial force and to calculate it. To understand the relationship between stress and strain produced in the section by the bending moment and to calculate it. To understand and calculate the shearing stress distribution in a beam section. To understand and calculate the eccentrically loaded compressed pillar.
		6th	Application to the design of structural elements (1): the allowable stress design method	The student perfectly understands the allowable stress design method and knows how to evaluate the security of a structure.
		7th	Application to the design of structural elements (2): exercises	The student perfectly understands the allowable stress design method and knows how to evaluate the security of a structure.
		8th	Mid-term Exam	
	4th Quarter	9th	Deformation of structural elements (1): deformation by axial force and bending moment (deflexion curve)	To calculate the deformation of due to axial stress.
		10th	Stress and strain degree (2): Types of stress degree, their relationship, and strain types	To calculate the deflection angle of a beam using differential equation and Mohr's theorem.
		11th	Deformation of structural elements (3): deformation by bending moment (deflexion curve)	To calculate the deflection angle of a beam using differential equation and Mohr's theorem.
		12th	Deformation of structural elements (4): deformation by bending moment (Mohr's theorem)	To calculate the deflection angle of a beam using differential equation and Mohr's theorem.
		13th	Deformation of structural elements (5): deformation by shearing stress and buckling	To calculate the deformation of a beam due to shear stress. To calculate Euler's buckling load for various support conditions.
		14th	Deformation of structural elements (6):exercises	To calculate the deformation of due to axial stress.To calculate the deflection angle of a beam using differential equation and Mohr's theorem.To calculate the deformation of a beam due to shear stress.To calculate Euler's buckling load for various support conditions.
		15th	Overall exercises	
		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