Akashi College	Year	2024		Course Title	Steel Structures B

Course Information

Course Code	6426		Course Category	Specialized / Compulsory
Class Format	Lecture		Credits	School Credit: 1
Department	Architecture		Student Grade	4th
Term	Second Semester		Classes per Week	2
Textbook and/or Teaching Materials				
Instructor	NAKAGAWA Hajime			

Course Objectives

1) To calculate the allowable stress level of steel, and to design the section of a column and a beam.
2) To do the assignment in the design the joint of a beam, and be able to execute the design of various joint.
3) To take photos of actual steel frame structures around the student residence area and to elaborate a report using the knowledge acquired.

Rubric

	Excellent	Good	Insufficient
Achievement 1	Can well calculate and design the structural members receiving axial force and bending.	Can calculate and design the structural members receiving axial force and bending.	Can not calculate or design the structural members receiving axial force and bending.
Achievement 2	Can well calculate and design bending structural members.	Can calculate and design bending structural members.	Can not calculate and design bending structural members.
Achievement 3	Can well calculate and design the joint (column, beam joint, etc.)	Can calculate and design the joint (column, beam joint, etc.)	Can not calculate and design the joint (column, beam joint, etc.)

Assigned Department Objectives

Teaching Method

Outline	Steel structures have its parts produced in factories, structural elements such as columns and beams, and the framework are assembled in the site by joining those elements with high-strength bolts or welding. In this course, the students will learn about compressed material, bending material, the cross-sectional design method of material to subjected to bending and axial force, and the design method of the beam, column joint, and pillar/ beam joint.The course will give examples of how the content learned relates to design and construction work in the real world.
Style	The course will follow the textbook. At the end of each chapter, the students will handle reports. At the free assignment, the students will compare the contents learned in class with steel structure they have observed in the city.
Notice	The course will present as many examples as possible of steel (steel frame) structure. The students should take notes during class and handle our requested assignments. 5 absences will be excused. Students who miss 1/3 or more of classes will not be eligible for evaluation.

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	Compression member (B-1) Lecture on the design equation of compression member.	To understand the pros and cons of steel structure, types and mechanical properties of steel materials.
		2nd	Compression member (B-2) Explanation of an example model of compression member. Assignment (1)	To explain the width-to-thickness ratio of a compression member, and the design example of the textbook. To design a compression member.
		3rd	Bending member (1) Lecture on the stress of bending member through the example model. Quiz (1)	To understand bending members (beams) and stress.
		4th	Bending member (1) Lecture on the lateral buckling torsion of a bending member.	To understand the transverse torsional buckling of bending members (uniform twist and restraint twist).
		5th	Bending member (2) Lecture on the lateral buckling torsion of a bending member.	To understand the transverse torsional buckling of bending members (uniform and restraint tortional).
		6th	Bending member (3) Lecture on the allowable stress method of bending member.	To understand and design the allowable bending stress of a bending member.
		7th	Bending member (5) Introduction to a design example of bending member. Assignment (2)	To understand and design a bending member.
		8th	Member under axial force and bending moment (1) Explanation, using the example model, of the column member and the relationship of axial force and bending moment .	Bending, shearing, and axial force act on the pillar. Using an example, to understand the relationship between axial force and bending.

		9th	Member under axial force and bending moment (2) Lecture on the allowable stress method of the column member.	To understand and design axial force and structural members to be bent.
		10th	Presentation of the report	Can present the things that you learned from weeks 1 to 7.
		11th	Member under axial force and bending moment (3) Explanation of an example model of the column material. Assignment (3)	To understand and design axial force and structural members to be bent. To design a pillar based on the example of the textbook.
	4th Quarter	12th	Column and beam joint (1) Lectures on the column-beam joint and the design method of beam joint.	To understand the basics of joints and design beam joints through the analysis of samples of methods of joining pillars and beam structural members.
		13th	Column and beam joint (2) Lecture on the design method of beam joint. Explanation of the allowable stress joint design, all strength joint design and the ultimate joint design for beam joint.	To understand the design method of the beam joint.
		14th	Column and beam joint (3) Explanation of an example of a model of beam joint. Assignment (4)	To understand the design method of the beam joint.
		15th	Column and beam joint (4) Lecture on the design method of column joint and column-beam joints. Introduction to how to think about the three type of diaphragm based on joint design experience.	To understand joining method of pillar-beam joint and its design method.
		16th	Final exam	Can understand the contents from 3rd to 15th weeks through the exam.

Evaluation Method and Weight (%)

	Examination	Assignments	Presentation	Total
Subtotal	60	20	20	100
Basic Proficiency	0	0	0	0
Specialized Proficiency	60	20	20	100
Cross Area Proficiency	0	0	0	0