

Theory of Structure in Architecture 1

Course Name	Course type (credit/hours)	Required course(3/3)	Course code	E025
	Target students Division/major/grade	Architecture/Sophomore	Opening semester	2021 1ST SEMESTER
	Class time and classroom	Tue E(IUC827)Thu D(IUC827)	English Grade	A(100%English)
Reference to this course	Prerequisite courses	수학1		
	Related basic courses	수학1		
	Recommended concurrent courses	건축구조		
	Related advanced courses	Theory of Structure in Architecture 2		

Instructor	Name (title/division)		Kim, Jinyoung(Associate Professor, Architecture)			
	Office Room Number	산학협력원 712	Office phone Number	1536	e-mail	
	Office hours	AIMS2 학생상담 가능 시간 참조		Homepage address	https://bitlab.ajou.ac.kr/	
Teaching Assistant	Name (title/division)					
	Office Room Number	산학협력원 810호	Office phone Number	3580	e-mail	fbgudals@ajou.ac.kr

1. Introduction

Theory of Structure in Architecture 1 is one of the most important courses in the Architectural Engineering as a basis of all other analysis courses available in the department of Architectural Engineering. This course will provide the students with the basic knowledge to deal with a variety of structural problems in the structural engineering field. In addition, problems and examples in this class can be used at a later time to prepare for the exam necessary to obtain a professional engineering license.

Through an elastic analysis of statically determinate structures, students are expected to learn the basic mechanical behavior of structures subjected to static loads.

Students in the Architecture major will also be able to learn basic knowledge in the Architectural Engineering, which can be applied in a variety of design and planning projects.

2. Course Objectives

최종목표는 건축구조물에 하중(외력)이 작용할 때, 구조물에 생기는 변화(응력, 변형 등)를 해석하는 기초적인 지식을 습득하는 것이다. 외력에 의해 구조물에 생기는 부재력(축방향력, 전단력, 휨 모멘트)을 해석하고 구조부재의 단면의 특성을 이용하여 구조부재내에 존재하는 응력의 분포와 크기를 해석하고 이해하여 구조부재의 기초적인 설계 개념을 익히고 전반적인 건축(공)학의 전문가가 되는데 필요한 능력을 얻게 됩니다.

교과목 학습 성과는 다음과 같이 정리할 수 있습니다.

- 1) 구조물에 작용하는 하중의 영향을 분석하고 설명할 수 있다.
- 2) 하중에 의해 발생하는 구조물 내의 부재력(축방향력, 전단력, 휨 모멘트)을 해석하고 설명할 수 있다.
- 3) 부재 내에 발생한 부재력의 의미와 응력의 분포를 해석할 수 있다.

The objective of the course is that the students acquire the basic knowledge in the structural analysis: determined the force and moment that act within a structural member, calculate the internal loadings developed in structural members, and understand the basic concept of the structural design process.

The outcome of the course can be described as follows:

- 1) determine the effects of external loads on statically determinate structures,
- 2) analyze the internal loadings developed in structural members, and
- 3) calculate the distribution of the stress.

3. Class types and activities

Off-line lectures are given as a primary lesson tool. Students will take 3 quizzes (1 quiz before and 2 quizzes after the midterm exam).

4. Teaching Method

- | | |
|--|---|
| <input checked="" type="checkbox"/> lecture | <input type="checkbox"/> discussion and debate |
| <input type="checkbox"/> team project(presentation and case studies) | <input type="checkbox"/> experiments(role-playing,etc) |
| <input type="checkbox"/> designing and production | <input type="checkbox"/> on-site learning(on-site training) |
| <input type="checkbox"/> others | |

5. Support Systems in Use

- | | | |
|--|---|---|
| <input checked="" type="checkbox"/> AjouBb | <input type="checkbox"/> automatic recording system | <input type="checkbox"/> web-based assignment |
| <input type="checkbox"/> cyber lecture | <input type="checkbox"/> online content | |
| <input type="checkbox"/> class behavior analyzing system | <input type="checkbox"/> others | |

6. Teaching Tools

- | | | |
|---|---|---|
| <input checked="" type="checkbox"/> PBL(Problem Based Learning) | <input type="checkbox"/> CBL(Case Based Learning) | <input type="checkbox"/> TBL(Team Based Learning) |
| <input type="checkbox"/> UR(Undergraduate Research) | <input type="checkbox"/> FL(Flipped Learning) | <input type="checkbox"/> DSAL(Data Science Active Learning) |
| <input type="checkbox"/> others | | |

7. Knowledge and ability required for taking this course

구조역학 1의 수업을 수강하기 위해서는 고등학교에서 배운 수학과 물리 지식이면 충분합니다.
기초적인 미분과 적분의 내용이 전체 수업 중에서 약 3시간 정도의 수업에서 응용됩니다.
따라서 미리 준비해야할 기초지식과 도구 능력은 없습니다.

A bit of mathematical knowledge, intention to learn, and English proficiency.

8. Method of Evaluation

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance		10%	1/8 credit deducted at every absence until zero, and F thereafter
midterm exam	1	25%	
final exam	1	30%	
quiz	3	30%	
presentation			
discussion			
homework			
etc		5%	
study hours			

9. Textbook and supplementary material

Main/Sub	Title (Web-site)	Writer	Publisher	Publication year
Main	Structural Analysis 9th Ed. In SI Unit	R.C. Hibbeler	Pearson	2014
Sub	구조 역학	김상식	기문당	2009

10. Class system and Class shedule

<p>Week 1: Various types of structural forms and loads.</p> <p>Weeks 2–7: Determination of forces at the supports and connections of statically determinate beams and frames.</p> <p>Week 8: Midterm Exam</p> <p>Weeks 9–10: Analysis of various types of statically determinate trusses.</p> <p>Weeks 11–15: Shear and bending-moment functions and diagrams for beams and frames.</p> <p>Week 16: Final Exam</p>
--

< Class Schedule >

* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
1	Introduction / Classification of Structures	K/E	Kim, Jinyoung	Lecture		
2	Loads	K/E	Kim, Jinyoung	Lecture		
3	Structural Design / Idealized Structure & Principle of Superposition	K/E	Kim, Jinyoung	Lecture		

< Class Schedule >

* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
4	Equilibrium Equations & Determinacy and Stability	K/E	Kim, Jinyoung	Lecture		
5	Quiz 1 / Quiz Review	K/E	Kim, Jinyoung	Review	Quiz	Engineering Calculator
6	Application of the Equations of Equilibrium	K/E	Kim, Jinyoung	Lecture		
7	Application of the Equations of Equilibrium / Midterm Review	K/E	Kim, Jinyoung	Lecture / Review		
8	Midterm Exam	K/E	Kim, Jinyoung		Written Exam	Engineering Calculator
9	Exam Review / Truss Analysis: Method of Joints	K/E	Kim, Jinyoung	Review / Lecture		
10	Truss Analysis: Zero-Force Members / Truss Analysis: Method of Sections	K/E	Kim, Jinyoung	Lecture		
11	Quiz 2 / Quiz Review	K/E	Kim, Jinyoung	Review	Quiz	Engineering Calculator
12	Internal Loadings at a Specified Point / Shear and Moment Functions	K/E	Kim, Jinyoung	Lecture		
13	Quiz 3 / Quiz Review	K/E	Kim, Jinyoung	Review	Quiz	Engineering Calculator
14	Shear and Moment Diagrams for a Beam / Frame	K/E	Kim, Jinyoung	Lecture		
15	Section Design / Final Review	K/E	Kim, Jinyoung	Lecture / Review		
16	Final Exam	K/E	Kim, Jinyoung		Written Exam	Engineering Calculator

11. Other items of notification