

西安交通大学《建筑技术基础》课程教学大纲

一、课程基本信息

I. Basic Information

课程名称 Course Title	建筑技术基础 Architectural Technology Fundamentals		
课程编号 Course Number			
课程学分 Credits	3	总学时 Credit Hours	48
学时分配 Assignment of Credit Hours	理论:48 实验____ 上机:/ 课外:/ (课外学时不计入总学时) Lecture: 48 Studio: _Practice in the IT room:/ Extracurricular:/(Extracurricular hours do not count towards the total number of hours.)		
课程类型	<input type="checkbox"/> 公共课程 Public Course <input type="checkbox"/> 通识课程 General Education Course <input type="checkbox"/> 学科门类基础课 <input type="checkbox"/> 专业大类基础课 <input checked="" type="checkbox"/> 专业核心课 Specialized Core Course <input type="checkbox"/> 专业选修课 Specialized Elective Course <input type="checkbox"/> 集中实践 Intensive Practice		
开课学期	<input type="checkbox"/> 1-1 <input type="checkbox"/> 1-2 <input checked="" type="checkbox"/> 2-1 <input type="checkbox"/> 2-2 <input type="checkbox"/> 3-1 <input type="checkbox"/> 3-2 <input type="checkbox"/> 4-1 <input type="checkbox"/> 4-2 <input type="checkbox"/> 5-1 <input type="checkbox"/> 5-2		
先修课程	n/a		

Prerequisites	
教材、参考书及其他资料	[序号] 作者 1, 作者 2.教材名称.出版地: 出版者, 出版年. 例: [1] 刘国钧, 陈绍业.电路分析.北京: 高等教育出版社, 1994.
Materials (Textbook, Bibliography or Referencing and Supplementary Materials)	[1] Author 1, Author 2. Title of the textbook. Publication place: publisher, year of publication. [1] Allen E., How buildings work: the natural order of architecture. Oxford: Oxford University Press, 2005. [2] Ching F. D.K., Building construction illustrated. Hoboken: John Wiley & Sons, 2020. [3] Deplazes A., Constructing Architecture: Materials, Processes, Structures: A Handbook, Base: Birkhauser, 2018. [4] Emmit S., Architectural Technology. Oxford: Wiley-Blackwell, 2012. Links to further material will be provided during the course.

二、课程目标及学生应达到的能力

II. Course Objectives and Expected learning outcomes

(工科专业对标工程教育认证标准中专业毕业要求的 12 条具体指标点, 其他专业对标行业/评估标准中专业毕业要求的具体指标点)

The course of Architectural Technology Fundamentals has the aim of helping students to identify and define design criteria which guide the choice between different techniques according to the social, physical, industrial and economic context and paying great attention to the life cycle of a building, from cradle to grave.

More precisely the didactic objectives of the course are:

1. Deepen the structure and the classification of the building system and its parts;

2. Provide knowledge about the characteristics of materials, sub-systems and components (production processes, embodied energy, the relationship between materials, manufacturing, properties and performances, resources and opportunities);
3. Explore the phases of the life cycle of the building and building components, with particular attention to the aspects of environmental sustainability and circularity (e.g. deconstruction, dismantling, etc.);
4. Figure out the standard technological/constructive solutions used in building practice on the national territory, comparing them with other application contexts (e.g. Italy).

In particular, the teaching activities will refer to the study of innovative technological and construction systems, characterized by performance levels suitable for the current needs of environmental and energy sustainability (from the environmental compatibility of materials and components to the circularity of the building process and the construction sector - 5 R: refuse, reduce, reuse, repurpose, recycle).

The course includes lectures and exercises.

The lectures aim to provide the student with the cognitive tools to analyze and understand:

- the relationship between constructive solution and architectural configuration (correspondence between characteristics of materials

- and techniques and formal outcomes achieved);
- the relationship between needs, requirements and performances (performance of materials and components compared to the satisfaction of specific needs of users);
 - the relationship between the context and the building (specificity of the different cultural, climatic and productive contexts).

The exercises are aimed at evaluating the application implications of the topics addressed in the lessons. In particular, case study analysis activities are envisaged, with insights into the building system and its articulation into sub-systems and components, the analysis of the materials and components used, as well as the evaluation of their performance outcomes.

课程目标与专业毕业要求的关联关系

Correlation between course objectives and graduation requirements
for the program

毕业要求：

Graduation Requirements

Students of this major should meet the following graduation requirements in terms of knowledge, ability and calibre.

A. Possess broad theoretical knowledge of humanities and social sciences and natural sciences, strong scientific literacy, humanistic and artistic dispositions, and sound physical and mental well-being.

B. Have solid theoretical knowledge related to architecture, master the basic principles of architectural design, history and theory of architecture, architecture and behaviour, the safety of architecture, building structure, building materials and construction, control of the physical environment of buildings, urban and rural planning and landscape design, economy and regulations, systems and professional codes, responsibilities of architects and other related knowledge.

C. Have the methods and skills of architectural design and related planning design, master the process and methods of architectural design and have a strong ability to express and practice architectural design, as well as good creative thinking and artistic creation ability and the ability to analyze problems and solve them comprehensively.

D. Have an international open vision and the ability to communicate, compete and cooperate across cultures.

毕业要求 课程目标	A	B	C	D
1	L	M	M	M-H
2	M	H	H	M-H
3	M	M-H	M	M
4	L	M	M	H

注：毕业要求中 A、B、C、D、E、F、G、…对应毕业要求中各项具体内容。课程目标与专业毕业要求的关联关系用 H/M/L 标注。

Note: A, B, C and D indicate the specific aspects of the graduation requirements. H, M and L refer to a strong, medium and weak correlation between the course objectives to the graduation requirements respectively.

三、教学内容简介

III. Description of teaching contents

章节顺序	章节名称 Chapter Title	知识点 Teaching Points	参考学时 Credit Hours
1	Introduction	<ul style="list-style-type: none"> - Introduction to Architectural Technology field and to the Performance-based design approach; - Introduction to the concepts of environmental sustainability and circularity. 	20%
2	Classification of building system	<ul style="list-style-type: none"> - Breakdown analysis of building systems sub-systems and components. 	15%
3	Characteristics of materials, sub-systems and components	<ul style="list-style-type: none"> - Analysis of the main technical and constructive solutions - both traditional and advanced - in relation to the different parts of the building organism (characteristics, performance behavior, selection criteria) and the related building 	30%

		<p>components;</p> <ul style="list-style-type: none"> - Analysis of cases study deepening the relationship between constructive solution and architectural configuration. 	
4	5R	<ul style="list-style-type: none"> - Introduction to the notion of 5R: refuse, reduce, reuse, repurpose, recycle; - Analysis of systems, sub-systems and components with reference to the characteristics of sustainability and circularity (e.g. deconstruction, dismantling, etc.). 	25%
5	Standard technological/constructive building solutions	<ul style="list-style-type: none"> - Identification of the main technological/constructive solutions commonly used in building sector (e.g. comparison between Chinese and Italian practices). 	10%

四、教学安排详表

IV. Teaching Arrangements

序号	教学内容 Teaching contents	学时分配 Credit Hours	教学方式 Teaching Methods	教学要求 (知识要求及能力要求) Learning Objectives (knowledge objective & ability objective)	对课程目标的支撑关系 Related to which Course Objective
1	Introduction	20%	Lectures	<p>a) Provision of cognitive tools to analyze and understand:</p> <ul style="list-style-type: none"> - the relationship between constructive solution and architectural configuration; - the relationship between needs, requirements and performances; 	All

				- the relationship between the context and the building (specificity of the different cultural, climatic and productive contexts).	
2	Classification of building system	15%	Lectures and exercises	<ul style="list-style-type: none"> a) Acquisition of knowledge in the reading and breakdown of the building system according to the classification into technological units, classes of technological elements and single components; b) Through an exercise students will improve their ability in analyzing architectures and thus they will improve their design skills. 	1
3	Characteristics of materials, sub-systems and components	30%	Lectures and exercises	<ul style="list-style-type: none"> a) Acquisition of knowledge about material, sub-systems and components (production processes, embodied energy, the relationship between the nature of materials, manufacturing, properties and performances, resources and opportunities, etc.); b) Acquisition of knowledge about innovative materials and components, with attention to the aspects of environmental sustainability and circularity; c) Through exercises, students will improve their skills in managing design alternatives. 	2
4	5R	25%	Lectures and exercises	<ul style="list-style-type: none"> a) Acquisition of knowledge in the fields of environmental sustainability and circularity; b) Through exercises, student will improve their ability in selecting innovative and environmental-friendly solutions. 	3

5	Standard technological/constructive building solutions	10%	Lectures	a) Acquisition of knowledge about the typical technological/constructive solutions used in building practice in different application contexts.	4
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注：对课程目标的支撑关系可填写大纲中第二部分课程目标的相应序号。

The column *Related to which Course Objective* can be filled in with the number of the corresponding course objective in Part II.

五、实践环节

V. Studio/Lab

实验编号 No.	实验名称 Subject Name	实验内容 Contents	教学方法 Teaching Methods	对课程目标的支撑关系 Related to which Course Objective
1	Classification of building system	Students will be asked to breakdown selected cases study into systems/subsystems	Guided exercise of case study	1
2	Analysis of characteristics of materials, sub-systems and components	Students will be asked to develop research activities on characteristics of systems/sub-systems and materials	Guided exercise consisting in research activity/analysis of case study	2
3	Analysis of systems/sub-systems and materials 5R	Students will be asked to develop research activities on characteristics of deconstruction, dismantling, etc of systems/sub-systems and materials	Guided exercise consisting in research activity/analysis of case study	3

注：对课程目标的支撑关系可填写大纲中第二部分课程目标的相应序号

The column *Related to which Course Objective* can be filled in with the

number of the corresponding course objective in Part II.

六、课外学时分配

VI. Extracurricular Practice

章节顺序	内容 Contents	参考学时 Credit Hours	对课程目标的 支撑关系 Related to which Course Objective
1	n/a	n/a	n/a
2			
...			

注：对课程目标的支撑关系可填写大纲中第二部分课程目标的相应序号。

七、考核方式及成绩构成

VII. Evaluation and Composition of Grades

The assessment will take place through a final exam (individual oral exam), during which the contents of the entire course program and the proposed exercises will be discussed. The elaboration of the exercises according to the times indicated during the course is a necessary condition for admission to the exam.

The oral exam, with questions on the connection between the topics of the course and the contents of the exercises carried out by the student, has as its objective the evaluation of the knowledge acquired and the ability to re-elaborate this knowledge in application terms, also by making connections between the theoretical and the applied aspects.

平时： _____ %， (包含： xxxx)

实验 (上机)： _____ %; (包含： xxx)

期末： _____ %

10% for usual performance (including active participation to lectures),
60% for mid-term examinations (considering 3 exercises, 20% each)
and 30% for final examinations.

<本部分构成及考试方式可根据具体课程定制> Depending on the
course

大纲制定者: × × ×

This syllabus was developed by _____

大纲审核者: × × ×

This syllabus was reviewed by _____

最后修订时间: _____年__月__日

Date of the final revision of the syllabus _____(yyyy/mm/dd)