

# Curriculum Standard

Curriculum: Construction Equipment

Major: Engineering Cost

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# " Construction Equipment "

## Curriculum Standard

**Curriculum:** Construction Equipment

**Credit:** 2

**Class Hour:** 34

**Major:** Engineering Cost

### 1. Preface

#### 1.1 Position definition

Construction equipment is a basic course for all majors in the College of architectural engineering. Students are required to master the reading ability of building equipment drawings and the construction ability of installation engineering, learn the methods and skills of building equipment drawing recognition, and cultivate students' ability to solve practical problems in engineering. It also lays a foundation for subsequent professional courses such as installation engineering drawing recognition, construction engineering measurement and pricing, installation engineering measurement and pricing, engineering cost practice, engineering project management and engineering cost management.

#### 1.2 Instructional design

The overall design idea of this curriculum standard: Based on the curriculum system guided by the working process, select the curriculum content according to the needs of ability training; Change the knowledge standard into the ability standard, and set the goal of professional ability training based on the analysis of task and professional ability; Change the original form of classroom lectures, highlight the cultivation of innovation ability, create work scenes with the projects of building water supply and drainage engineering, ventilation and air conditioning engineering and building electrical engineering as the carrier, and cultivate students' basic ability to independently analyze and solve practical problems in building materials and equipment engineering in combination with the examination requirements of vocational qualification certificate.

The course standard is employment oriented. The teaching content of this course is determined according to the task and professional ability analysis of the job groups covered by the construction specialty by industry experts and in close combination with the assessment requirements of professional qualification certificates. In order to fully reflect the idea of task leading and practice oriented curriculum, the teaching activities of this course should be divided into several projects, the teaching should be organized in the unit of projects, and the relevant professional theoretical knowledge should be introduced with typical cases as the carrier, so that students can deepen their understanding and Application of professional knowledge and skills in project practice, cultivate students' comprehensive professional ability and meet the needs of students' career development.

### 2. The Targets of course

## 2.1. Overall Target

Through the task decomposition, task decomposition and multiple project practice of building water supply and drainage engineering, ventilation and air conditioning engineering and building electrical engineering, master the skills and relevant theoretical knowledge of building equipment, cultivate the quality of integrity, hard work, good communication and cooperation, establish the awareness of comprehensiveness, cooperation and unity, and lay a good foundation for the development of professional ability.

## 2.2. Specific Target

Requiring students to study through this course will enable them to use Excel software to analyze and predict examples and improve their ability to analyze and solve practical problems in marketing and sales management. We should also pay close attention to the dynamics of enterprise marketing management, especially in recent years, statistical data and various statistical analysis methods, and implement them into classroom teaching and practice, such as the use of Excel to compile Pivot-tables, the use of Excel for combined analysis. Pay attention to the application of domestic Excel software in enterprises and institutions, especially in the daily office of enterprises, guide students how to use Excel software to carry out daily statistical work on enterprise marketing management, and statistical analysis of enterprise-related data, to provide a basis for enterprise marketing decision-making.

### 2.2.1 Knowledge

- 1) Have the ability to identify and analyze the composition of building water supply and drainage system and read corresponding construction drawings;
- 2) Have the ability to identify and analyze the composition of ventilation engineering system and read corresponding construction drawings;
- 3) Have the ability to identify and analyze the composition of air conditioning engineering system and read corresponding construction drawings;
- 4) Have the ability to identify and analyze the composition of building electrical system and read corresponding construction drawings.

### 2.2.2 Ability

- 1) Be able to know the classification and function of construction equipment engineering;
- 2) Be familiar with the composition of building water supply and drainage system;
- 3) Be familiar with the composition of building ventilation and air conditioning system;
- 4) Be familiar with the composition of building electrical engineering system.

### 2.2.3 Characteristics

- 1) Cultivate the morality of honesty, trustworthiness, prudence and peace;
- 2) Develop the learning habit of being good at using your brain, thinking hard and finding problems in time;
- 3) Enhance the team consciousness of being good at communicating with customers and working with colleagues, and be able to carry out good team cooperation.

## 3. Content and Demand

| Serial Number | Tasks                                     | Subject Introduction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Event Design                                                                                                                                                                                                    | hour |
|---------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 1             | Building water supply and drainage system | <b>1. Building water supply system</b><br><b>(1) Knowledge Requirements:</b><br>① Understand the basic knowledge of indoor water supply and drainage engineering;<br>② Master the classification method and system composition of building water supply system;<br>③ Master building water supply mode;<br><b>(2) Skills Requirements:</b><br>Have the ability to state the composition of the building water supply system and judge the water supply mode.                                                                                       | (1) Teaching methods<br>① Teaching ✓<br>② Combination of teaching and practice ✓<br>③ Case analysis ✓<br>④ Discussion ✓<br>⑤ Practical training<br>⑥ Others:<br>(2) Practical project                           | 6    |
|               |                                           | <b>2. Building indoor fire water supply system</b><br><b>(1) Knowledge Requirements:</b><br>① Understand the composition and function of indoor fire hydrant system;<br>② Be familiar with the classification and composition of indoor automatic sprinkler system;<br>③ Master the reading method of fire engineering construction drawings.<br><b>(2) Skills Requirements:</b><br>Have the ability to state the composition and function of building fire protection system, and be able to read building fire protection construction drawings. | (1) Teaching methods<br>① Teaching ✓<br>② Combination of teaching and practice ✓<br>③ Case analysis ✓<br>④ Discussion ✓<br>⑤ Practical training<br>⑥ Others:<br>(2) Practical project                           | 4    |
|               |                                           | <b>3. Building drainage system</b><br><b>(1) Knowledge Requirements:</b><br>① Understand the composition and function of building drainage system;<br>② Be familiar with the layout principle of drainage system pipeline;<br>③ Master building drainage mode;<br><b>(2) Skills Requirements:</b>                                                                                                                                                                                                                                                  | (1) Teaching methods<br>① Teaching ✓<br>② Combination of teaching and practice ✓<br>③ Case analysis ✓<br>④ Discussion ✓<br>⑤ Training ✓<br>⑥ Others:<br>(2) Practical project<br>Interpretation of water supply | 4    |

|   |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                             |   |
|---|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|   |                                              | Have the ability to state the composition and function of building drainage system and judge the way of building drainage.                                                                                                                                                                                                                                                                                                                                                                                                                     | and drainage system of real project construction equipment installation engineering                                                                                                                                                         |   |
| 2 | Ventilation and air conditioning engineering | <b>1. Ventilation engineering</b><br><b>(1) Knowledge Requirements:</b><br>Master the basic knowledge of ventilation engineering; Fire prevention and smoke exhaust of high-rise buildings.<br><b>(2) Skills Requirements:</b><br>Have the ability to read the construction drawings of ventilation engineering.                                                                                                                                                                                                                               | (1) Teaching methods<br>① Teaching ✓<br>② Combination of teaching and practice ✓<br>③ Case analysis ✓<br>④ Discussion ✓<br>⑤ Practical training<br>⑥ Others:<br>(2) Practical project                                                       | 4 |
|   |                                              | <b>2. Air conditioning engineering</b><br><b>(1) Knowledge Requirements:</b><br>Master the basic knowledge of air conditioning engineering;<br><b>(2) Skills Requirements:</b><br>Be able to read air conditioning engineering drawings;                                                                                                                                                                                                                                                                                                       | (1) Teaching methods<br>① Teaching ✓<br>② Combination of teaching and practice ✓<br>③ Case analysis ✓<br>④ Discussion ✓<br>⑤ Training ✓<br>⑥ Others:<br>(2) Practical project<br>Reading of construction drawings of air conditioning works | 4 |
| 3 | Building electrical engineering              | <b>1. Building power supply and distribution system</b><br><b>(1) Knowledge Requirements:</b><br>① Understand power system and power network, low voltage distribution;<br>② Understand the basic concepts of power system and power network, low-voltage distribution power network and low-voltage distribution mode;<br>③ Master the power supply system of high-rise buildings.<br><b>(2) Skills Requirements:</b><br>Master the power supply system of high-rise buildings. Have the ability to interpret power system and power network. | (1) Teaching methods<br>① Teaching ✓<br>② Combination of teaching and practice ✓<br>③ Case analysis ✓<br>④ Discussion ✓<br>⑤ Practical training<br>⑥ Others:<br>(2) Practical project                                                       | 2 |

|  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                             |   |
|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  |  | <p><b>2. Electrical lighting</b></p> <p><b>(1) Knowledge Requirements:</b></p> <p>① Understand the basic concept of lighting and the types of common electric light sources;</p> <p>② Familiar with the types and selection of lamps;</p> <p>③ Master the laying of indoor lighting lines and the setting requirements of distribution boxes and control appliances.</p> <p><b>(2) Skills Requirements:</b></p> <p>Have the ability to interpret the laying of indoor lighting lines and the setting of distribution boxes.</p>         | <p>(1) Teaching methods</p> <p>① Teaching ✓</p> <p>② Combination of teaching and practice ✓</p> <p>③ Case analysis ✓</p> <p>④ Discussion ✓</p> <p>⑤ Practical training</p> <p>⑥ Others:</p> <p>(2) Practical project</p>                                                                                                                    | 2 |
|  |  | <p><b>3. Safe power use and building lightning protection</b></p> <p><b>(1) Knowledge Requirements:</b></p> <p>① Knowledge of safe electricity use;</p> <p>② Master the composition and function of building lightning protection system.</p> <p><b>(2) Skills Requirements:</b></p> <p>Have the ability to interpret the engineering composition and functions of lightning protection and grounding system.</p>                                                                                                                       | <p>(1) Teaching methods</p> <p>① Teaching ✓</p> <p>② Combination of teaching and practice ✓</p> <p>③ Case analysis ✓</p> <p>④ Discussion ✓</p> <p>⑤ Practical training</p> <p>⑥ Others:</p> <p>(2) Practical project</p>                                                                                                                    | 2 |
|  |  | <p><b>4. Building electrical construction drawing</b></p> <p><b>(1) Knowledge Requirements:</b></p> <p>① Understand the reading sequence of construction drawings of building electrical engineering;</p> <p>② Familiar with the use of common legends in construction drawings of building electrical engineering;</p> <p>③ Master the reading method of electrical engineering construction drawings.</p> <p><b>(2) Skills Requirements:</b></p> <p>Have the ability to correctly read building electrical construction drawings.</p> | <p>(1) Teaching methods</p> <p>① Teaching ✓</p> <p>② Combination of teaching and practice ✓</p> <p>③ Case analysis ✓</p> <p>④ Discussion ✓</p> <p>⑤ Practical training</p> <p>⑥ Others:</p> <p>(2) Practical project</p> <p>Reading of electrical construction drawings of real project construction equipment installation engineering</p> | 4 |

|       |                             |                                                                                                                                                                                                                                                                   |                                                                                                                                                                                       |    |
|-------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 4     | <b>Intelligent building</b> | <b>(1) Knowledge Requirements:</b><br>① Understand the basic concepts of building intelligence;<br>② Understand the mechanism of building intelligent system.<br><b>(2) Skills Requirements:</b><br>Have the ability to distinguish intelligent building systems. | (1) Teaching methods<br>① Teaching ✓<br>② Combination of teaching and practice ✓<br>③ Case analysis ✓<br>④ Discussion ✓<br>⑤ Practical training<br>⑥ Others:<br>(2) Practical project | 2  |
| Total |                             |                                                                                                                                                                                                                                                                   |                                                                                                                                                                                       | 34 |

#### 4. Feasible suggestion

##### 4.1 Suggestions on textbook selection and compilation

###### 4.1.1 Textbook selection

The first choice is the national planning textbook for Vocational Education in the 12th Five Year Plan, and it is suggested to promote the practice oriented school-based textbook. The teaching materials and teaching reference materials used in the teaching of this course include the main teaching materials, main reference books and reference materials as follows:

[1] Shao Zhengrong Construction equipment Beijing: China University of Geosciences Press, 2012

[2] Code for design of building water supply and drainage Beijing: China Construction Industry Press, 2009

[3] Code for acceptance of construction quality of building water supply, drainage and heating engineering Beijing: China Construction Industry Press, 2002

###### 4.1.2 Suggestions on textbook compilation

Take the teaching task as the main line, clarify the teaching content, integrate theoretical knowledge and skill training, effectively mobilize students' interest in learning, promote students' positive thinking and practice, and pay attention to the development of students' professional ability through "teaching, learning and doing". The main chapter takes the division of learning situation as the main line, and takes the real work task as the carrier to carry out classroom teaching design and strengthen the cultivation of students' ability.

(1) Teaching materials must be compiled according to the curriculum standards, and the teaching materials should fully reflect the curriculum design idea of task guidance and practice orientation.

(2) The professional activities of the specialty shall be divided into several typical work items, and the contents of teaching materials shall be organized according to the needs of completing the work items and the requirements of post operation procedures.

(3) The contents of textbooks should reflect the advanced nature, versatility and practicability. We should timely incorporate the new trends and achievements of this major into teaching materials, so that the teaching materials can be more close to the professional development and practical needs.

(4) The description of teaching materials must be concise, accurate and scientific. The content of activity design in teaching materials should be specific and operable.

(5) Teaching materials should fully reflect the curriculum concept and serve the realization of the curriculum objectives stipulated in the curriculum standards.

(6) The compilation of teaching materials is based on the curriculum standard, but it should be more specific, vivid and easy to operate than the requirements of the curriculum standard.

#### 4.1.3 Suggestions on the use of teaching materials and teaching reference materials

Basic knowledge and map reading of construction equipment (4th Edition) (a series of skill based planning textbooks for civil engineering in Higher Vocational Colleges in the 21st century), Peking University Press, ye Wen, Zhou Xiaolong.

#### 4.2 Teaching suggestions

4.2.1 In the teaching process, we should strengthen the cultivation of students' practical operation ability, adopt project teaching, improve students' learning interest and stimulate students' sense of achievement.

4.2.2 The key to the teaching of this course is to take specific engineering projects as the carrier. In the teaching process, the teacher's case analysis is consistent with the students' group discussion and understanding. Through the teacher's theoretical teaching, guide the students to carry out in class and centralized mechanics training, and strive to integrate the textbook theory with practice, refine, practical and highlight the key points in the content arrangement. Pay attention to the appropriate relationship between depth and breadth. On the basis of highlighting the basic properties of cement, cement concrete and materials, widely introduce the existing domestic knowledge and development of various building materials and relevant new materials and technologies, so as to broaden ideas and facilitate the rational selection of building materials. In the part of construction equipment, explain in combination with construction equipment engineering, and then carry out operation practice and practical training operation practice, so that students can learn to read construction equipment drawings in various projects of construction equipment.

4.2.3 In the process of teaching, we should create a working situation, closely combine the requirements of professional quality training, and strengthen practical operation training. In project management training, improve students' post adaptability.

4.2.4 In the teaching process, it is necessary to explain in combination with classic cases of construction equipment engineering to help students understand.

4.2.5 In the teaching process, we should pay attention to the latest technology and knowledge in the professional field and be close to the reality of construction equipment engineering. Provide students with space for career development and strive to cultivate students' innovative spirit and professional ability.

4.2.6 In the teaching process, teachers should actively guide students to improve their professional quality and professional ethics.

#### 4.3 teaching assessment and evaluation suggestions

4.3.1 Reform the traditional means and methods of student evaluation, and adopt the stage evaluation, target evaluation, project evaluation and the integrated evaluation mode of theory and practice.

4.3.2 Pay attention to the diversity of evaluation, and comprehensively evaluate students' scores in combination with classroom questions, students' homework, usual tests, skill competitions and examinations.

4.3.3 We should pay attention to the assessment of students' practical ability and ability to analyze

and solve problems in practice. We should give special encouragement to students with innovation in learning and application, and comprehensively evaluate students' ability.

#### 4.4 Development and utilization of curriculum resources

According to the course objectives, students' reality and the characteristics of professional skills of this course, the teaching resources of this course should be composed of text teaching materials, multimedia courseware, construction drawings of each module and other supporting teaching materials. Take the written teaching materials as the core, provide learning support services with different connotations and various forms, and jointly complete the teaching tasks and achieve the teaching objectives.

#### 4.5 Suggestions on teaching conditions

4.5.1 Pay attention to creating learning situations, make full use of the favorable conditions of multimedia and network resources, collect a large number of building materials and equipment examples according to the activity design content of the course project, organize students' simulation training, help students understand and master the knowledge and analysis ability related to mechanics, stimulate students' interest in learning, and promote students' understanding and mastery of professional knowledge.

4.5.2 Pay attention to the development and utilization of curriculum resources and modern teaching resources, actively develop and utilize network curriculum resources, stimulate students' interest in learning, make students' learning no longer limited to the classroom, and promote students' understanding and mastery of knowledge.

4.5.3 Industry university cooperation to develop training course resources, make full use of typical enterprise resources in the industry, strengthen industry university cooperation, establish practice and training base, practice work and study alternately, meet students' practice and training needs, and create opportunities for students' employment at the same time.

#### 4.6 Other instructions

4.6.1 Teachers have basic theoretical knowledge and relevant skills of building materials.

4.6.2 Teachers can design situations according to teaching methods and implement the teaching process according to the designed teaching situations.

4.6.3 Teachers can correctly handle, guide, summarize and summarize abnormal problems in students' operation.

4.6.4 The middle school hours of this course standard are reference hours, and teachers can make appropriate adjustments according to the actual situation of the college.

