

Curriculum Standard

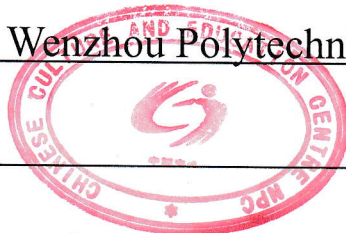
Curriculum: Construction Engineering Survey

Major: Construction Engineering Technology

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" Construction Engineering Survey "

Curriculum Standard

Curriculum: Construction Engineering Survey

Credit: 3.5

Class Hour: 64

Major: Construction Engineering Technology

1. Preface

1.1 Course nature

Construction engineering survey is a professional basic course of construction engineering technology. Its goal is to cultivate students' basic professional ability to engage in construction engineering survey. Students of this major should basically meet the basic requirements of relevant professional ability in the intermediate professional level examination of construction engineering survey and setting out workers.

1.2 Design ideas

The working process involved in this course is: survey preparation → leveling → angle measurement → distance measurement → small area control survey → topographic map mapping and application → construction engineering survey.

"Construction engineering survey" is a major professional technical course of construction engineering technology specialty. Through various teaching links such as teaching, homework, course experiment and comprehensive practical training, students can master the basic theory, basic knowledge and measurement methods of "construction engineering survey", be familiar with the use of measurement instruments, and have the ability to undertake construction survey through the training of basic measurement skills.

Under the premise of ensuring the advanced nature and practicability, the teaching contents should be actively integrated with the teaching contents, and the key points of the experiment, training and practice should be strengthened. On the basis of mastering the basic knowledge of surveying, highlight the cultivation of instrument operation and construction setting out ability, and reform the requirements of professional posts for knowledge and skills, so as to apply what they have learned.

Focus on mastering the concepts and functions of geoid and plumb line, the essence of survey work, the representation method of ground point position, the concepts and differences of absolute elevation and relative elevation, and the concepts of elevation difference; Master the method of calculating the elevation of unknown points by height difference method and instrument height method, the collimation axis, the use of level gauge, the causes and elimination methods of parallax, the reading method of level ruler, the method of leveling, recording, calculation and verification, and the calculation method of attaching the results of leveling route; Master the function of each screw of DJ6 optical theodolite, the reading method of micrometer micrometer, the definition and classification of vertical right angle, and the measurement method of vertical right angle; Master the general method and accuracy evaluation method of steel ruler measuring

distance, distance measurement, photoelectric rangefinder and total station ranging method, master the concept of azimuth, the concept of coordinate azimuth and its calculation, and the concept of quadrant angle; Master the concepts of systematic error and accidental error; Calculation formulas of mean square error, allowable error, relative mean square error and mean square error of arithmetic mean; Master the field work of traverse survey, coordinate forward and reverse calculation, surveying methods, object symbols and geomorphic symbols of third and fourth order leveling; Master the general method of measuring and setting known horizontal distance, the general method of measuring and setting known horizontal angle, measuring and setting known elevation on the ground, rectangular coordinate method and polar coordinate method to measure and set the plane position of points; Master the building baseline, the layout and setting out method of building grid, the common positioning method of buildings, the setting out method of buildings, the general foundation construction survey, the settlement observation and inclination observation of buildings.

2. Course objectives

2.1 Overall objective

Through the study of this course, students can master the basic theoretical knowledge, operation methods and skills of construction engineering survey; Be familiar with the operation of measuring instruments, use measuring instruments to carry out construction engineering measurement and setting out, accurately draw topographic maps, correctly use construction drawings to set points and carry out construction setting out. Cultivate students' professional spirit of being hard-working, taking good care of instruments and tools and cooperating with each other; Cultivate students' serious, meticulous and realistic scientific attitude.

2.2 Specific objectives

2.2.1 Knowledge objectives

- (1) Master the basic theory and knowledge of engineering survey;
- (2) Master the theory and method of small area control survey;
- (3) Mapping method and application of large-scale topographic map;
- (4) Master the main contents and methods of construction engineering survey, and have the ability of construction engineering setting out.

2.2.2 Capability objectives

- (1) Be able to correctly use conventional measuring instruments (theodolite, level gauge and steel ruler) for general measurement, and be able to conduct general inspection on measuring instruments;
- (2) Be able to correctly use rangefinder, total station, automatic Anping level, electronic theodolite and other instruments, and understand GPS, electronic level and other new instruments;
- (3) According to the requirements of the specification, the survey data can be observed, recorded and calculated correctly, and the survey data required for setting out can be calculated correctly;
- (4) Capable of layout, observation and data processing of small area plane and elevation control network;
- (5) Be able to independently organize the surveying and mapping of large-scale topographic map, and master the application of topographic map in construction engineering;
- (6) Be able to master the survey and setting of construction control network and the construction survey methods in industrial and civil buildings.

2.2.3 Quality objectives

Be able to develop the moral character of honesty and trustworthiness, hard-working, teamwork consciousness, safety production consciousness, professional ethics of loving and dedicated work, good habits of saving resources, protecting the environment and caring for public and private property, etc.

3. Course content and requirements

Serial Number	Tasks	Subject Introduction	Event Design	hour
1	Measurement preparation	<p>(1) Knowledge content and requirements:</p> <p>① Understand the contents, tasks and functions of this course, as well as its historical evolution, production development at home and abroad and overview of cutting-edge fields.</p> <p>② Understand the procedures, characteristics and requirements of survey work and the determination method of points on the ground.</p> <p>(2) Skill content and requirements:</p> <p>① Ability to calculate plane coordinates;</p> <p>② Have the ability to calculate elevation.</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 Cognitive instrument</p>	4
2	Leveling	<p>(1) Knowledge content and requirements:</p> <p>① Understand the methods of elevation survey, the related concepts of elevation survey, and the error sources and reduction methods of leveling.</p> <p>② Understand the structure of S3 level and the field and office work of leveling.</p> <p>(2) Skill content and requirements:</p> <p>① Have the ability to use level to measure data;</p> <p>② Have the ability to calculate elevation;</p> <p>③ Have the ability to analyze the error source and reduction method of leveling.</p>	<p>(1) Teaching methods</p> <p>① Lecture</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 Observation and calculation of closed leveling route.</p>	12
3	Angle measurement	<p>(1) Knowledge content and requirements:</p> <p>① Understand the reading method of theodolite, the definition of horizontal angle and vertical right angle and their angle measuring principle, and the source of horizontal angle measurement error.</p> <p>② Understand the structure of theodolite, the function and use of various components, the measurement method of horizontal angle and the measurement method of vertical right angle.</p> <p>(2) Skill content and requirements:</p> <p>① Have the ability to use theodolite to measure</p>	<p>(1) Teaching methods</p> <p>① Lecture</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 Observation and</p>	16

		<p>data;</p> <p>② Ability to calculate angle;</p> <p>③ Have the ability to analyze the error source and reduction method of angle measurement.</p>	<p>calculation of closing angle.</p>	
4	Distance measurement	<p>(1) Knowledge content and requirements:</p> <p>① Understand the definition of horizontal distance measurement and coordinate azimuth.</p> <p>② Understand the general method, precision method and calculation of steel ruler measuring distance, and understand the calculation and calculation method of coordinate azimuth.</p> <p>(2) Skill content and requirements:</p> <p>① Ability to measure data with steel ruler;</p> <p>② Ability to calculate precise distance;</p> <p>③ Have the ability to analyze the error source and reduction method of distance measurement.</p>	<p>(1) Teaching methods</p> <p>① Lecture</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>Distance measurement.</p>	4
5	Small area control measurement	<p>(1) Knowledge content and requirements:</p> <p>① Understand the concept of control measurement.</p> <p>② Understand the field survey and field calculation of closed and attached conductors.</p> <p>(2) Skill content and requirements:</p> <p>① Have the field ability to use instrument measurement data;</p> <p>② Have the ability to calculate, close and attach conductors;</p> <p>③ Have the ability to analyze the error source and reduction method of conductor.</p>	<p>(1) Teaching methods</p> <p>① Lecture</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>Closed traverse observation and calculation.</p>	10
6	Mapping and topographic map application	<p>(1) Knowledge content and requirements:</p> <p>① Understand the application of topographic map.</p> <p>② Understand the basic knowledge of topographic map (scale of topographic map, feature symbols, geomorphic symbols, contour lines, characteristics of contour lines).</p> <p>(2) Skill content and requirements:</p> <p>① Have the field ability to use instrument measurement data;</p> <p>② Have the ability to draw topographic map;</p> <p>③ Have the ability to analyze the error source and reduction method of topographic map.</p>	<p>(1) Teaching methods</p> <p>① Lecture</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>Simple topographic map observation and calculation.</p>	8
7	Construction	<p>(1) Knowledge content and requirements:</p> <p>① Understand the measurement of circular curve</p>	<p>Construction Engineering Survey</p>	10

	Engineering Survey	<p>and basic elements.</p> <p>② Understand the method of measuring and setting out points, the type and characteristics of the control grid of the construction site, the layout and measurement method of building baseline and building grid, the positioning and setting out of buildings, and the construction measurement process of building foundation and wall. Understand the contents and requirements of elevation control survey on the construction site.</p> <p>(2) Skill content and requirements:</p> <p>① Have the ability of simple building positioning and setting out;</p> <p>② Have the ability to control the elevation of the construction site.</p>	<p>(1) teaching method</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>Use control points for setting out.</p>	
Total			64	

4. Implementation recommendations

4.1 Suggestions on textbook selection and compilation

4.1.1 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.

4.1.2 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 post work procedures, combined with the requirements of vocational level examination. Through the surveying and setting out of typical construction projects, we should introduce the necessary theoretical knowledge, strengthen the operation training, and emphasize the application of theory in the process of practice.

4.1.3 The teaching materials should be illustrated and combined with diagrams to improve students' learning intuition and initiative and deepen students' understanding and understanding of project bidding. The description of teaching materials must be concise, accurate and scientific.

4.1.4 Teaching materials should reflect the advanced nature, versatility and practicability. We should bring new technology, new technology and new equipment into the teaching materials in a timely manner, so that the teaching materials can be more close to the professional development and practical needs.

4.1.5 The activity design content in the textbook shall be specific and operable.

4.2 Teaching suggestions

4.2.1 Teaching design

The teaching of course skills passed: (1) teachers' demonstration teaching in class; (2) Unit skill training; (3) Instrument assessment; (4) One week comprehensive skill training; (5) The assessment of Surveying and setting out workers shall be carried out in five stages, from easy to difficult, step by step and continuously improved.

The course training scheme is designed to be operable, assessable and assessable, with good simulation and strong practicality; The organization, management and guidance work shall be standardized and orderly, managed in groups and levels, strengthened the guidance of the training process and reduced errors. In particular, the guidance before the internship shall be strengthened,

the internship tasks, measurement methods, data to be observed and accuracy requirements shall be clarified, and the field work and office work of students shall be checked in time. In practical teaching, the requirements for teachers are: Students' Union is required, and teachers must be proficient first. Master relevant skills, and must know how to guide and organize experimental training.

The requirements for students are: they must practice hard, complete each task of experimental training independently, and everyone is required to pass the instrument operation, measurement method and application.

The basic requirements for practical teaching: pre class guidance, orderly organization of experimental training, strengthening process guidance and highlighting practical effects. Teachers must follow the students in the whole process, patiently and carefully guide, fully implement all links of experimental training, and take the cultivation of skills and abilities as the most important standard to judge the quality of teaching work.

4.2.2 Teaching methods

In the design of teaching methods, we advocate the integrated teaching method of "teaching, learning and doing", give full play to students' subjective initiative, and promote the improvement of students' innovative consciousness and practical ability. Focus on cultivating students' ability to solve practical engineering problems, cultivate students' ability to find problems and solve problems in a team way, and enhance students' development potential.

Build a "three-dimensional" teaching method. Apply modern information technologies such as network and multimedia to organically combine and infiltrate in class teaching, Extracurricular Autonomous Learning, research on intermediate surveying and setting out workers, surveying interest groups and surveying skills, and create all conditions for students to fully use their hands and brains.

In the course teaching, a variety of teaching methods are adopted, and the use of measuring instruments is taught by demonstration method; Measure the basic theoretical knowledge and adopt heuristic teaching; The measurement of leveling route and theodolite traverse, using case teaching; Comprehensive practical training and simulation teaching; Construction survey adopts real production case teaching and visiting teaching.

4.2.3 Teaching means

It has formed a variety of teaching means combining teaching courseware, operation video, course website and the second classroom, made full use of modern information technologies such as network and multimedia, combined inside and outside the class, and promoted the development of students' learning ability. Take the real work task as the carrier, design the teaching process and combine teaching, learning and doing; Make rational use of modern information technology and other means to reform the traditional teaching process and teaching mode. The course has abundant network teaching resources and reasonable structure. The relevant syllabus, semester teaching plan, electronic teaching materials, teaching plans, courseware, exercises, test question bank, experimental training guidance and engineering case teaching have been opened online, realizing the sharing of high-quality teaching resources.

4.3 Teaching assessment and evaluation suggestions

To implement process assessment, we should comprehensively assess the students' usual classroom participation, homework completion, especially their performance in practical teaching, record the results, and increase the proportion of daily assessment. So that examination is not only

a means to test the learning effect, but also an integral part of students' relearning and training.

Specific assessment and evaluation suggestions are as follows:

Score: final assessment score = 60% of usual assessment + 40% of final assessment;

4.4 Development and utilization of curriculum resources

4.4.1 Pay attention to the development and application of experimental training instructions and experimental training materials.

4.4.2 Pay attention to the development and utilization of curriculum resources and modern teaching resources, which are conducive to creating vivid working situations, stimulating students' interest in learning and promoting students' understanding and mastery of knowledge. At the same time, it is suggested to strengthen the development of curriculum resources, establish the database of multimedia curriculum resources, and strive to realize the sharing of Cross School multimedia resources, so as to improve the utilization efficiency of curriculum resources.

4.4.3 Actively develop and utilize online course resources, make full use of online information resources such as e-books, e-journals, databases, digital libraries, educational websites and electronic forums, and change teaching from single media to multiple media; Teaching activities change from one-way transmission of information to two-way exchange; Students' individual learning changes to cooperative learning. At the same time, we should actively create conditions to build a distance teaching platform and expand the interactive space of curriculum resources.

4.4.4 Schools and enterprises cooperate to develop experimental training course resources, make full use of typical enterprise resources in the industry, strengthen school enterprise 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.

4.4.5 Expand the open training center of the specialty to enable it to have the functions of on-site teaching, experimental training and vocational skill certification, realize the integration of teaching and practical training, teaching and training, and teaching and certification, and meet the requirements of students' comprehensive vocational ability training.

4.5 Suggestions on teaching conditions

Strengthen and improve the allocation of teaching software and the construction of updating measuring equipment.

4.6 Other instructions

The standard middle school hours of this course are reference hours, and the specific implementation can be adjusted according to the actual number of weeks of classes and holidays.