

# Research on the cultivation of vocational skills and professionalism in the course of precision detection technology and application in Higher Vocational Colleges

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**Abstract:** higher vocational colleges are one of the main positions to implement the fundamental task of Building Morality and cultivating talents, and to cultivate builders and successors of socialism with Chinese characteristics. They undertake the important task of cultivating high-quality technical and skilled talents to serve regional development. As an important carrier of talent training in higher vocational colleges, the curriculum must adhere to the integration of education and talent cultivation in the process of system design and teaching implementation. Taking the precision detection technology and application of the platform course of mechanical manufacturing and automation specialty group as an example, this paper systematically analyzes and shows the cultivation of students' professional skills and professionalism in the implementation process of the course from the aspects of curriculum education goal design, curriculum main content design, and curriculum teaching implementation, which can provide reference for professional courses in Higher Vocational Colleges to give full play to the comprehensive educational function of the course.

**Key words:** higher vocational colleges; Vocational skills; Professional quality;

## introduction

As an education of different types from general education, vocational education undertakes the important task of providing talents and intellectual support for China's economic and social development, and plays a very important role in China's social and economic development. Huang Yanpei pointed out that the main purpose of vocational education is to "seek the development of personality, prepare for personal livelihood and serve the society". Since the reform and opening up, with the continuous development of social economy, the training objectives of Vocational Education in China have been constantly developing and changing, from "technical personnel, management personnel and technicians" in the 1980s to "practical talents and applied talents" in the 1990s, and then to "skilled talents, technical skilled talents and high-quality technical skilled talents" since the 21st century, The training objectives of vocational education are not only more and more clear and precise, but also put the cultivation of technical skills and the cultivation of quality in the same important position.

The report of the 18th National Congress of the Communist Party of China proposed for the first time that "moral education is the fundamental task of education". "Morality" is to establish noble character and personality, "cultivating talents" is to cultivate talents with noble morality and exquisite skills, that is, to cultivate talents with all-round development of morality, intelligence, physique, art and labor for social development. As one of the main positions for the implementation of vocational education and the cultivation of qualified talents, higher vocational colleges should implement the fundamental task of morality and talent cultivation, adhere to the unity of education and talent cultivation, and cultivate high-quality technical and skilled talents who match the positions of enterprises and are both virtuous and skilled. Among them, education is to cultivate students' professional qualities such as family and country feelings, professionalism, craftsman spirit, model worker spirit and scientific spirit. Talent cultivation is to meet the core competence needs of enterprise posts and cultivate vocational labor skills that can make students competent for enterprise related posts and create personal value.

Higher vocational colleges should be committed to cultivating high-quality technical and skilled talents who match the positions of enterprises, and the curriculum is the core carrier of talent training in higher vocational colleges, which plays a vital role in talent training. Therefore, in the design and implementation of curriculum teaching, we must comprehensively cultivate students' professional quality and skills. This paper analyzes and studies the cultivation of students' vocational skills and professionalism in the course of precision detection and technology application in higher vocational colleges, and puts forward the effective path of vocational skills cultivation and professionalism shaping for higher vocational students.

## 1.Course overview

With the rapid development and rapid change of China's equipment manufacturing industry, the key is to continuously improve the manufacturing quality, and high-level precision testing technology and high-quality precision testing talents are the necessary conditions and important support to improve the manufacturing quality and promote the high-end development of the manufacturing industry. The course of precision detection technology and application of mechanical manufacturing and automation specialty group in higher vocational colleges is to cultivate compound precision detection talents who can canonically, accurately and efficiently complete the geometric measurement and analysis of mechanical products for the high-end intelligent manufacturing industry. This course aims to strengthen students' ability to interpret mechanical part drawings and test the dimensional tolerance performance of mechanical products, so that students can fully

understand and master the latest technology in the field of precision testing, so as to have the professional skills required for positions related to industrial product testing. At the same time, this course also undertakes the important task of shaping students' professional labor quality.

## 2. Curriculum education goal design

This course is designed to implement the requirements of "higher vocational schools should cultivate high-quality technical and skilled talents to serve the regional development" put forward in the implementation plan of national vocational education reform. The overall goal is to meet the core competence needs of mechanical parts quality inspection, quality manager, quality manager and other positions in intelligent manufacturing enterprises, and teach students professional theoretical knowledge. Train students' professional operation skills, cultivate students' good professional quality, and cultivate high-quality composite testing talents for regional intelligent manufacturing enterprises.

### 2.1 knowledge objectives

Through the study of this course, students can achieve the following knowledge goals: familiar with the working principle and operating conditions of CMM, cylindricity meter, roughness meter and other measuring instruments; Master the interpretation methods of common technical indicators of mechanical products, and master the technical specifications of product geometric quantities; Master the method of selecting appropriate measuring tools and gauges according to the characteristics and accuracy requirements of different products; Master the detection methods of different geometric quantities such as length, angle, shape error, position error and direction error; Master the design and implementation of inspection scheme for typical parts; Master the analysis and processing methods of test data and the writing methods of test report.

### 2.2 skill objectives

Through the study of this course, students will be guided to achieve the following skill goals: be able to correctly use basic measuring tools such as vernier calipers and micrometers, and high-precision measuring tools such as coordinate measuring machines and cylindricity meters; Be able to reasonably select measuring tools according to the dimensional tolerance, geometric tolerance, surface roughness and other accuracy requirements on the drawing of mechanical parts; Be able to correctly use measuring tools and meters to complete the measurement of geometric quantities of mechanical products; Be able to correctly complete the detection scheme design of complex parts and complete the measurement of geometric parameters of parts; Be able to analyze and evaluate the error of the test data; Be able to write understandable, reproducible and instructive mechanical product test reports; Be able to comprehensively use the knowledge learned to analyze and solve problems.

### 2.3 literacy objectives

Through the study of this course, students will consciously develop the following professional qualities: establish the awareness of taking good care of measuring instruments and equipment, consciously abide by the rules and regulations of the measuring room and equipment operation procedures, and operate measuring instruments and equipment strictly and normatively; Establish a sense of service to the country of manufacturing power, building the country through science and technology, and engaging in manufacturing; Establish the labor spirit of advocating labor, loving labor and honest labor; Cultivate the craftsman spirit of dedication, excellence and meticulousness; Cultivate the spirit of model workers who love their jobs, are diligent in thinking and have the courage to innovate; Develop a rigorous, scientific and realistic work style; Learn to communicate and have a strong team spirit.

## 3. Course main content design

This course is guided by the technology and talent needs of intelligent manufacturing enterprises in the Yangtze River Delta, and focuses on shaping students' professional quality and cultivating students' detection skills. The main teaching contents are as follows.

1. introduction to precision testing. The main knowledge is the development status of precision detection technology, the technical specification of product geometry and the selection method of measuring tools and meters. Relevant skills are: reading the dimensions, geometric tolerances and surface roughness marks on the drawing, and interpreting the meaning of geometric tolerances; Select appropriate measuring tools and meters according to the analysis of drawing marks.

2. linear dimension measurement of simple parts. The main knowledge is the measuring principle and use method of basic measuring tools such as vernier caliper and micrometer; Practical skills include the measurement of shaft diameter, aperture, depth and length, and the analysis and processing of measured data.

3. geometric error measurement of box parts. The main knowledge is the development history, working principle and operation method of CMM, and Calypso software programming method. The practical skills are: interpreting the mechanical drawings of parts, analyzing and determining the datum elements and measured elements; Pre preparation for parts cleaning and constant temperature; According to the part structure and testing requirements, reasonably clamp the parts and establish the basic coordinate system of the parts; The collection of part datum elements and measured elements, the editing of measurement strategies, and the editing of measurement features; The measurement

of geometric dimension and geometric tolerance of parts, post-processing of measurement data and report output.

4. cylindricity detection of shaft parts. The main knowledge is the working principle and operation method of cylindricity meter. Practical skills: analysis and interpretation of mechanical drawings of parts; Cleaning and clamping of parts; Measurement of geometric tolerance items such as roundness and cylindricity of parts; Preparation of automatic measurement program for roundness, cylindricity and other items, post-processing of measurement data and report output.

5. roughness detection of mobile phone screen. The main knowledge is surface roughness characterization method, working principle and operation method of roughness meter. Practical skills include surface roughness detection of mobile phone screen, parameter setting of surface roughness measurement, post-processing of measurement data and report output.

6. precision testing of industrial products. The main knowledge is the use principle and method of various measuring tools. The practical skills are to interpret the product mechanical drawings and analyze the features to be tested and benchmark elements; Comprehensively design the product inspection scheme; Measurement and report output of dimensions, geometric tolerances and surface roughness of industrial products.

## 4 course teaching implementation

Taking typical parts as the carrier, this course skillfully integrates the knowledge and skills related to precision testing into teaching examples, and takes “problem solving” as the task to arouse students’ interest and motivation in learning, promote students to explore and absorb knowledge, master skills, and implement theoretical knowledge teaching and practical skills training; At the same time, in the teaching process, improve students’ patriotic feelings and cultivate students’ professional quality.

### 4.1 vocational skill training

Higher vocational colleges should cultivate technical application-oriented talents who are competent for front-line jobs , correctly interpret the parameters such as the tolerance and technical requirements of mechanical products, reasonably select measuring tools and gauges to detect the geometric error of products, and write product test reports with high quality. They are engaged in quality testing of mechanical parts in intelligent manufacturing enterprises, quality managers Necessary professional skills for quality manager and other positions.

The course is mainly practical. By organizing students to measure and analyze the linear dimension of simple parts, the geometric error of box parts, the cylindricity of shaft parts, and the surface roughness of mobile phone plane, students are guided to learn the analysis and interpretation methods of mechanical parts drawings, the use methods of conventional measuring instruments and high-precision measuring instruments, and master the shaft diameter, aperture, and Professional skills such as detection and analysis of geometric errors such as length, depth, flatness, roundness, parallelism, perpendicularity, positional degree and surface roughness; Through the precise detection of complex industrial products, students’ detection skills and the ability to analyze and solve problems are comprehensively exercised and deepened.

### 4.2 professional quality training

Professional quality refers to the comprehensive quality presented in the process of professional labor . Shaping students’ good professional quality is conducive to the rapid development of students’ individual and social economy . The implementation of this course starts from the following aspects to shape students’ professional quality.

Build a training situation with a strong professional atmosphere. The teaching place of the course is the precision detection and micro measurement technology training room. By posting rules and regulations documents in the training room, students can consciously establish the awareness of caring for measuring instruments and equipment, and strictly abide by the rules and regulations of the measurement room and equipment operation procedures; Through eye-catching slogans, the development display of China’s high-end measuring instruments and so on , students are guided to form the feelings of serving the country of practicing excellent skills and joining the manufacturing power.

Implement diversified human culture training teaching. During the course teaching, teachers accurately demonstrate the operation, respect the measurement results, and guide students to develop the craftsman spirit of dedication, excellence and meticulousness, as well as the rigorous, scientific and realistic work style ; Organize students to cooperate in groups, complete measurement tasks with high quality and efficiency, and guide students to develop the spirit of model worker and team cooperation with diligence and innovation; Combined with teaching cases, skillfully introduce the growth and success stories of craftsmen and labor models from large countries, activate the classroom atmosphere, stimulate students’ learning enthusiasm, and promote the silent cultivation of students’ professional quality.

Build a multi-dimensional curriculum evaluation system. Objective, real and effective evaluation is an important guarantee for the efficient implementation of the curriculum . From the perspective of professional knowledge, testing skills, professional quality and other dimensions, this course evaluates students in the whole process and all-round way through students’ self-evaluation, students’ mutual evaluation, teachers’ evaluation and other methods. At the same time, it increases the proportion of professional quality evaluation, and encourages students to consciously develop good professional quality.

## epilogue

The course of precision detection technology and application of mechanical manufacturing and automation specialty group in Higher Vocational Colleges implements the fundamental task of Building Morality and cultivating talents, and systematically designs the educational objectives, main contents and teaching implementation path of the course, aiming at cultivating high-quality detection talents who are competent for the positions related to the quality detection of industrial products, which will comprehensively cultivate students' professional skills and qualities.

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