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Scientific Publishing

Preliminary Exploration of the Construction of Intelligent Manufacturing Engineering Major under the Background of Emerging Engineering

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Abstract: Intelligent manufacturing engineering major is a strategic emerging major to meet the needs of social progress, the major national strategy and the new engineering construction, and the cross-integration of multiple fields.This paper explores the content, methods and strategies of intelligent manufacturing major construction under the background of emerging engineering from the aspects of training objectives, teacher construction, curriculum system, platform construction and industry-education integration. It is an important attempt to build new majors under the background of emerging engineering, and it has certain reference significance for the construction of other majors.

Keywords: Intelligent Manufacturing Engineering; Talent Training Objectives; Double-Qualified Teacher; Integration of Industry and Education

Introduction

The college of mechanical and architectural engineering actively meets the needs of economic and social development and actively serves the transformation and upgrading of regional economy. Taking the construction of application-oriented undergraduate colleges and universities as an opportunity, the college has successfully applied for the major of intelligent manufacturing engineering. The major of intelligent manufacturing engineering is a strategic emerging major integrating multiple fields to meet the needs of social progress, national major strategies and new engineering construction. It is committed to cultivating compound and high-end talents. In order to strengthen the construction of professional application connotation, improve the level of professional construction, and strive to cultivate high-quality applied talents, the college will do an excellent job in the construction of intelligent manufacturing engineering from the following aspects.

1. Construction Content

1.1 Establishment of New Culture Goals

Intelligent manufacturing engineering is an emerging specialty integrating multiple fields. It organically combines basic disciplines such as control, information and management, and deeply integrates emerging technologies such as Internet of things, artificial intelligence and data science. It focuses on solving problems such as intelligent design and manufacturing, intelligent equipment design, intelligent manufacturing system planning, digital factory design and other issues, and cultivates students' comprehensive innovation ability and practical application ability. Facing the content of the emerging education system, we need to establish new talent training objectives. Let students master many skills to adapt to the society during their study. So that students can have high-end technology for professional development. We should implement more scientific education on the basis of students' understanding of learning objectives, such as establishing the commonality of professional development and social development, establishing the direction of social demand for engineering talents, and establishing the construction of new educational paths for their talent training. We should guide students to establish lofty ideals, and strengthen students' awareness of social responsibility and moral concepts in order to transport high-quality comprehensive industrial skilled talents for the society.

1.2 The Deepening of the New Teacher Team

Intelligent manufacturing engineering major is oriented to the social and practical needs. So the teaching staff must have rich practical experience, and achieve the training goal of engineering education talents, and help the construction and development of Intelligent Manufacturing Engineering major. To achieve this goal, teachers of intelligent manufacturing engineering must implement education from the perspective of foresight and guidance of social development, and convey the development plan of China's industrial power to students, so as to continuously strengthen students' sense of responsibility and mission. Therefore, teachers should not only have the skills to impart new industrial knowledge, but also have the ability to help students plan their future development, which requires teachers to have solid and comprehensive theoretical knowledge and some engineering practice experience and innovation ability. Building a team of double qualified teachers with reasonable structure, good at innovation, new educational ideas is the top priority of teaching. The college will adhere to the principle of combining introduction and training, and build a interdisciplinary double-qualified teacher team through various measures such as the combination of introduction and education, the mode of enterprise employment and so on.

1.3 The Reform of the New Curriculum System

Focusing on the pertinence of talent training quality standards, we should set up relevant courses, which increase interdisciplinary and compound knowledge, cutting-edge knowledge of new engineering and interdisciplinary professional cooperation education. We will reform talent training mode and reconstruct curriculum system, and build intelligent manufacturing specialty based on OBE concept with the connotation of "student-centered, output oriented and continuous improvement". Through the construction of the modular curriculum system, the organic integration of theoretical education and practical education, professional education and innovation and entrepreneurship education will be promoted. The specialized innovation will be highlighted in the curriculum teaching. The modular curriculum system must be oriented to the future, the new economy and the industry. Intelligent manufacturing involves many new technology fields. In terms of curriculum system and curriculum construction, we should build a scientific and reasonable interdisciplinary curriculum system, which adapt to the needs of different levels and majors. The relevant courses integrating new technologies and reflecting the needs of new industries should be set up. We should support the training of computing thinking ability, and strengthen the training of information integration innovation ability and engineering practice ability. First, we should build a new knowledge system and the content of education. New knowledge should have the characteristics of the times, development, guidance and innovation, and let students realize the important role of the new knowledge system in professional learning. We can strengthen the construction of the curriculum content of the new knowledge system from the aspects of big data, cloud computing and 5G. Second, we should highlight intelligent professional teaching courses, and comprehensively consider the connection and transition between the new curriculum and the traditional curriculum, and appropriately increase the content of the new curriculum based on intelligence. At the same time, the new curriculum of intelligent specialty should closely follow the development needs of industrialization of the times, focusing on cultivating students' ability of intelligent production and solving intelligent engineering problems[1]. Third, we should focus on interdisciplinary knowledge integration. With the advent of the intelligent era, intelligent manufacturing engineering has become the mainstream discipline in the development of higher education. Intelligent manufacturing engineering not only includes the content of traditional engineering disciplines, but also reflects the characteristics of discipline compatibility. To highlight the characteristic courses of Intelligent Manufacturing Engineering, we need to integrate the interdisciplinary integration of colleges and universities, and comprehensively reform the education system of engineering education courses, which promote students' comprehensive understanding of Intelligent Manufacturing Engineering, and realize the transformation from traditional engineering courses to new engineering intelligent courses.

2. Construction of Innovation and Entrepreneurship Practice Teaching Platform

Innovation and entrepreneurship practice is an important way to cultivate intelligent manufacturing talents. Due to the establishment of the practice platform, the learning and accumulation of engineering theoretical knowledge and the effect of practical ability and innovation ability have been greatly improved. The college will build or expand a number of new experimental training rooms on the existing basis such as robot training room, automatic production line installation and commissioning training room, three-dimensional modeling training room, control engineering comprehensive technology training room, reverse design training room, 3D printing training room, maintenance electrician training room, PLC technology training room and PLC technology comprehensive application training room, etc. To expand the functions of the professional experimental and training room, the experimental and training room is planned as two functional areas, one area for the integrated teaching of professional courses, theory and practice, and the one to carry out comprehensive innovation and entrepreneurship activities related to professional courses. The platform improves the practical ability, cooperation ability and innovation ability of teachers and students by serving the specific projects and projects of enterprises.

3. The Deepening of Industry-education Integration and School-enterprise Cooperation

We will make use of external enterprise resources, and build an intelligent manufacturing training base, and expand the breadth and depth of school enterprise cooperation, and create a new ecology of opening and integration of engineering education. Let students go deep into the school-enterprise cooperative enterprises to participate in experience and learning, so as to improve students' understanding and cognition of the new engineering. It will promote the innovation of the mode of combining science and education, integrating industry and education and cooperating in educating people. The scientific research achievements in the university will be practiced in the school-enterprise cooperation and education mechanism to promote the transformation of theoretical achievements to actual scientific research achievements. Finally, an intelligent manufacturing talent training ecosystem integrating industry and education and win-win will be formed, making intelligent manufacturing training become a knowledge space for self-growth[2]. Only by comprehensively integrating the new educational concept, new educational form, new educational curriculum, and establishing a systematic and perfect educational content of intelligent manufacturing engineering major of new engineering. It make students have new technology, new knowledge and new ability. Implementing the practical problems of social demand for talents and improving the practical innovation and operation ability of talents will help to meet the diversified needs of future social development.

4. Conclusion

In short, compared with traditional engineering disciplines, the construction of intelligent manufacturing engineering specialty must be led by virtue and talent cultivation[3], guided by the needs of emerging industries and aimed at high-quality employment. In order to cultivate high-quality compound new engineering talents who master the compound knowledge structure, and have diversified ability characteristics, excellent comprehensive quality and innovation ability, we must carry out a series of innovations from the revision of talent training scheme, curriculum construction, teacher team construction, experimental training platform construction and so on.

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