

Design of the Talent Cultivation Plan on "New Energy Materials and Devices Innovation Class"

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Abstract: This work revolves around the talent cultivation plan of the "New Energy Materials and Devices Innovation Class," which mainly targets the national new energy strategy and Guangdong Province's new energy development strategy. It aims to cultivate high-quality applied talents with basic theories and technical knowledge in the generation, transformation, and storage of new energy. In terms of the implementation plan of the talent cultivation scheme, measures such as a rolling selection mechanism, theoretical teaching, experimental teaching, practical links, graduation thesis (design), and post-graduation data collection have been adopted. Emphasis is placed on the construction of teacher teams and the construction of practical teaching bases, and the quality of talent cultivation is improved through a school-enterprise-locale joint practice training model. This work has a positive significance in exploring the talent cultivation model for the field of materials science.

Keywords: experimental courses, innovative talents, integration of industry, education, research

1. Professional basic situation

The major of material science and engineering and inorganic non-metallic materials engineering in this unit adopts a multi-level, theoretical and practical training mode, focusing on application education and output orientation. The training program considers the applicability of students' knowledge for 5 years or even life after graduation. Combined with the mode of all students equipped with professional tutors, it not only strengthens the guidance of students' practical ability, vocational skills and innovation ability, but also carries out all-round care and training for students in life and practice work, namely, "whole process tutorial system." We adhere to the school-running orientation of 'application, locality and openness', base ourselves on eastern Guangdong and serve Guangdong, and cultivate applied technical talents with solid natural science foundation and comprehensive material engineering professional knowledge, meet the high-quality development needs of new engineering in the new era of the country, conform to the industrial development trend of eastern Guangdong, and have practical spirit and innovative spirit^[1].

2. Talent training plan guidance system

2.1 Guiding ideology

The "New Energy Materials and Devices Innovation Class" mainly aims at the national new energy strategic needs and the new energy development strategy of Guangdong Province. It mainly trains students to master the basic theories and basic skills of new energy materials, new energy devices, photovoltaic materials and devices, and mainly serves the development of interdisciplinary materials and energy, science and technology and related industries^[2,3]. Taking the two majors of material science and engineering and inorganic non-metallic material engineering as the basic units, the innovation class is used as the carrier to carry out the training of new energy materials and devices, and to fill the needs of

industrial personnel training in the cross field of new energy and new materials in eastern Guangdong. Based on the existing school-running foundation and advantages of the material specialty group, we make full use of the teaching achievements of teaching mode innovation and teaching method reform in the past five years, and constantly explore new reform paths in the cross-integration of disciplines and specialties, the innovation of training mode and curriculum system. At the same time, we introduce high-quality resources outside the enterprise industry, deepen the integration of science and education, industry and education, and continuously enhance the ability of practical innovation. Through the implementation of the innovation class project, it further highlights the important position of our school in serving local industries and supporting the economic development of eastern Guangdong, constantly condenses the characteristics of material specialty and the advantages of discipline development, and focuses on the cultivation of compound, applied and innovative talents in the fields of new energy, new materials and intelligent manufacturing.

2.2 Training objectives

This innovative class aims to cultivate high-quality applied talents with basic theoretical and technical knowledge of new energy generation, transformation and storage, who can be engaged in the development, research and design of new energy materials and devices, as well as the management and transformation of their manufacturing process. The innovation class focuses on cultivating students who master the basic theoretical knowledge and professional skills of new energy materials science, solar cells and energy management.

3. Talent training plan implementation plan

3.1 Reform measures of talent training mode

How to construct the talent training mode is the primary task in the construction process of the excellent engineer class of material specialty. Many universities have also made some meaningful explorations on this process^[4]. Based on the training mode of material science and engineering and inorganic non-metallic material engineering, this unit integrates the characteristics of new energy material and device talent training to design the training mode. Combining the basic scientific principles of new energy (solar energy, lithium battery, energy storage and energy management, etc.), highlighting the characteristics of the cross-application of new energy and new materials, and focusing on guiding students from inheritance learning to inquiry discovery learning. The following reforms have been carried out in the talent training mode of the innovative class:

3.1.1 Rolling selection mechanism

For the students who are willing to further study in the top of the professional ranking, according to the rolling form of the academic year, there are in and out, and the college assessment is qualified. The innovative class training plan for the new academic year (the number does not exceed 20 % of the majors of the college), the unqualified automatic withdrawal of the innovative class training plan for the new academic year, and the students included in the plan are equipped with teachers with doctoral degrees and senior professional titles to guide their professional knowledge and research ability throughout the process.

3.1.2 Theoretical teaching

Self-construction and introduction of external high-quality online learning resources, combined with information technology (such as MOOC platform, virtual simulation, etc.) and tutor guidance (tutorial system), so that pre-class preview and professional literature reading become the first guarantee for the achievement of talent training objectives ;

3.1.3 Experimental teaching

Combined with the needs of the new energy industry in eastern Guangdong and the Pearl River Delta for the training of materials professionals, increase the intensity of comprehensive experimental construction of materials, especially in the content of the new energy materials and devices related to the training of skills.

3.1.4 Practice

Independence, combined with local industries, facing the new energy industry and combining with the specific

situation of Chaozhou City, the construction of practical courses should be carried out, which not only highlights the cultivation of innovative ability, but also emphasizes the integration of ideological and political elements such as family and country feelings and service society, so that the education of moral education can be implemented fundamentally.

3.1.5 Graduation thesis (design)

Combining professional practice and other practical courses, introducing enterprise industry experts, on-campus and off-campus tutors to jointly design and guide the practice and graduation thesis (design) of innovative classes, and establishing five dimensions from book learning to assembly line practice, from classroom listening to production line visit, from ideological understanding to physical practice, from professional knowledge to service social consciousness, from independence to collaborative research.

3.2 Construction of teaching staff

We will build a high-quality teaching staff, form an excellent professional teaching team, and take measures to train and build a high-quality 'double-qualified' teaching staff with profound professional theoretical foundation and rich industry research and development, technology and management experience. Specific measures are:

(1) Through the project construction, training teachers, improve the level of education. Sign a cooperation agreement with the enterprise to train double-qualified teachers.

(2) Employing senior engineers with doctoral degrees from excellent off-campus enterprises as co-supervisors for graduation practice and graduation design to enrich the practical teachers of the project.

3.3 Construction of practical teaching base

For the excellent engineer class, strengthening the school-enterprise linkage training is the top priority of students' practical ability training^[5,6]. Through the school-enterprise-local three-party joint practice training mode, such as 'Sanhuan Class', 'Songfa Class', 'Huafeng Class', 'Kaipu Class' and other characteristic classes, the scope of school-enterprise cooperation is continuously broadened and the level of school-enterprise cooperation is improved. The School of Materials will continue to build more and more perfect practical teaching bases, complete students' practice and employment services with quality and quantity, cultivate comprehensive, innovative and applied engineering and technical talents, and really promote the economic construction of Chaozhou City in terms of human resources protection.

4. Conclusion

This work is guided by the actual needs of the society for talents, with the goal of cultivating high-quality applied undergraduate talents, through the combination of basic theoretical knowledge teaching and hands-on practice teaching, the construction of a teaching system characterized by the practice course jointly guided by the on-campus and off-campus tutors. The characteristic curriculum resources of new energy materials and devices are constructed synchronously with the excellent cases of curriculum ideological and political education. In the process of construction, in addition to the basic courses related to new energy materials and devices, combined with the local new energy industry, the actual demand points of new energy storage and management in the emerging photovoltaic industry, power battery industry and smart grid in eastern Guangdong are investigated in depth, and the relevant contents of the characteristic courses such as technology, analysis and management of new energy materials and devices for Chaozhou and eastern Guangdong are gradually constructed, which has certain exploration significance for the training of outstanding engineers in materials specialty.

Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

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