

Research on Market-oriented Training of Applied Undergraduates in Electronic Science and Technology

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Abstract: The current situation of industrial development and the problems in training applied talents of Electronic Science and Technology(EST) are discussed here. The characteristics and objectives of market-oriented talents training for EST have been established, and it is integrated circuit back-end application-oriented personnel training. Some optimizing and reforming measures have been implemented through reforming the training plan, creating characteristic laboratories, strengthening the training and promotion of teachers' professional ability, strengthening the training of students' applied ability and other aspects, and certain results have been achieved.. It improves the disconnection between industry and talent cultivation in Colleges and universities, and provides a good reference for the application-oriented talents cultivation of science specialty.

1. Introduction

Discipline is the important foundation of modern higher education and the logical starting point of the existence of modern universities. Universities are built around disciplines. Therefore, the logical relationship among disciplines, specialties and personnel training is generally recognized at home and abroad: first disciplines, then specialties, and finally personnel training. That is to say, colleges and universities generally follow the path of "setting up departments - setting up specialties - cultivating talents" to start the work of talent cultivation. It is not difficult to see that up to now, the professional construction and talent training are based on discipline construction, but have nothing to do with industry, which directly leads to the serious disconnection between higher education professional training and industrial demand. The development of Electronic Science and Technology (EST) lags behind the industrial process seriously. At present, the industry urgently needs IC back-end design talents. However, the talents trained by EST in domestic colleges and universities do not meet the needs of the industry. To this end, the goal of training market-oriented IC back-end applied talents has been established.

2. Situation analysis

Under the background of the new economy, the state vigorously advocates and develops the integrated circuit industry. There is a great shortage of IC back-end design applied talents in the integrated circuit industry chain, which puts forward the requirements for the integrated circuit talents needed by higher education and training industry. However, as the corresponding professional EST for the training of integrated circuit talents, there is a great gap between the talents it trains and the industrial needs. The reasons are as follows:

(1) The disharmony between the existing curriculum system and the integrated circuit necessary talents knowledge structure

As far as the current curriculum system of EST is concerned, the curriculum covers a wide area and the orientation of personnel training is not clear enough. Although integrated circuit-related courses are also offered, they are not systematic and lag far behind the training of IC back-end design personnel.

(2) The disharmony between the existing practical teaching mode and content and the core competencies required by IC talents

In terms of teaching content, the existing practice teaching of this major has a big gap with the ability goal of core competence training. In terms of teaching mode, the traditional practice teaching mode is used and the training of each module is paid more attention. Although the training objectives of each knowledge link are clear, the lack of correlation among the modules is a "bottom-up" training mode.

(3) The disharmony between the existing talent training resources and the goal of IC talent training

Talent training resources are the core factors that affect the quality of talent training. Because of the rapid development of integrated circuit industry brought by the technological changes, the existing talent training resources can not meet the needs of the integrated circuit talent training objectives. For example, the existing teachers lack of understanding of industrial needs, lack of industrial practical experience, which restricts the training of applied IC talents, and the existing experimental environment can not meet the teaching needs of new goals.

3. Reform measures

Aiming at the opportunity of training integrated circuit talents brought about by the strategic demand of vigorously developing the integrated circuit industry under the background of the new national economy, aiming at the industry demand that IC back-end design applied talents are extremely lacking in the integrated circuit industry chain, this paper makes a thorough analysis of the requirements of the integrated circuit industry chain for applied talents' knowledge, ability and quality, and firmly relies on the study of Microelectronics College of Southeast University. The advantages of science and industry of integrated circuit industry service center in Nanjing Jiangbei New Area are explored and studied in depth. Through the research and practice of this project, we can find out the orientation of IC applied talents training, reconstruct the relevant curriculum system, build a practical platform with certain characteristics, and innovate the talent training mechanism. At the level of independent colleges, we have explored an applied talents training mode for integrated circuits to adapt to the new economic development, and constructed a suitable talent training system.

(1) Analyzing and researching the requirements of knowledge, ability and quality required by the technological changes of integrated circuit industry for different levels of talents, especially applied talents. According to the route map of the technological progress of integrated circuit industry, finding out the orientation of applied talents training which is suitable for the industrial chain of integrated circuits, aiming at the training of IC back-end design engineers, exploring the corresponding training mode of talents. Establish a suitable talent training system to accurately meet the needs of the national integrated circuit industry development strategy.

(2) Focusing on the key points and difficulties of Application-oriented Undergraduates in IC talents training, this paper explores the ways, methods and modes of integration of industry and education, school and land, and cross-specialty. To build a "five in one" talent training base, which integrates teaching practice base, student employment base, source of enterprise tutors, teacher enterprise research base and production-university cooperation research base.

(3) Start the engine of cohesive innovation, make full use of the advantages of national policy, location adjacent to Jiangbei New Area and subject advantages of mother school, construct the curriculum system of integrated circuit applied talents training, which emphasizes the training of engineering and technical ability and is in accordance with the needs of industry, and innovate the training mechanism and system of integrated circuit applied talents.

4. Reform effect

In order to realize the characteristics and objectives of EST's Talents Training, a series of reforms and measures have been implemented in the areas of the reformation of training program,

establishment of Characteristic Laboratory, training and Promotion of teachers' professional ability and strengthening the training of students' applied ability. Great efforts have been made to optimize and reform, and some results have been achieved.

In view of the problems of unclear orientation, weak systematicness and serious disjunction with industry in the current curriculum system, a new curriculum system for talent training is constructed. The new curriculum system, while adhering to basic theory education, strengthens practice and highlights practical teaching, can better enhance the ability of students to solve practical engineering problems.

According to the requirement of training integrated circuit back-end application-oriented talents for EST, a special experiment and Training Center for electrical specialty has been established and completed. In addition to meeting the requirements of basic experiments, the experimental training center has created an integrated circuit laboratory specially, which can well support the practical teaching of integrated circuit curriculum design and TANNER PRO curriculum design, and provide a practical platform for training students' professional skills in integrated circuits. In addition, the hardware and software configurations in the laboratory are the mainstream technology configurations in the industry, so that professional training and industrial needs can be seamlessly linked.

In order to solve the problem of the lack of industrial experience of existing teachers and further improve the professional skills and scientific research and teaching level of electrical professional teachers, five key professional teachers have been selected to enter universities and leading industries and enterprises for research and training since the professional reform, with particular emphasis on the training and practice of teachers in integrated circuit specialty. At present, every electrical professional teacher participates in training and learning of integrated circuits twice or more every year, attends related seminars twice or more, and at the same time uses summer vacation, every teacher enters relevant enterprises for summer practice and learning, which greatly improves the professional skills and level of electrical professional teachers.

Students actively participate in various professional practice activities under the new training mode and teaching methods, and actively participate in various professional competitions, such as the National Freescale Design Competition, the FPGA Design Competition and the Electronic Design Competition, etc. In 2018, they won three national prizes, the highest national first prize, 10 provincial and ministerial prizes, the highest provincial first prize, and college-level prizes. Nearly 20 awards were awarded, and more than ten papers were published by students majoring in EST. Through practical exercises in and out of class, students' professional knowledge and engineering practice skills on integrated circuits have been greatly improved. Electrical students graduated with 100% employment, and many students have been interned in integrated circuit-related enterprises before graduation and eventually retained smoothly.

5. Conclusion

The current situation of the industrial development and the problems in training applied talents of EST are discussed here. The characteristics and objectives of market-oriented talents training for EST have been established, and it is integrated circuit back-end application-oriented personnel training. Some optimizing and reforming measures have been implemented through reforming the training plan, creating characteristic laboratories, strengthening the training and promotion of teachers' professional ability, strengthening the training of students' applied ability and other aspects, and certain results have been achieved. It improves the disconnection between industry and talent cultivation in Colleges and universities, and provides a good reference for the application-oriented talents cultivation of science specialty.

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