

# Exploration and Research on Integrated Circuit Talents Training Mode for New Economy

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**Keywords:** Integrated Circuit; Personnel Training; Market Oriented

**Abstract:** The paper establishes the training objectives of integrated circuit talents for the new economy based on the study of the current situation and existing problems. With the help of the resources and platforms of parent school and cooperative enterprises, a series of reforms and measures for the training of integrated circuit talents oriented to the new economy have been implemented, and in-depth practical exploration and research have been carried out. Some experience and results have been achieved, which has a good reference and promotion value for the research of integrated circuit talents training.

## 1. Introduction

The integrated circuit industry is the foundation and core of information technology industry. It is a strategic, basic and leading industry to support economic and social development and guarantee national information security. Its technological level and development scale have become one of the important symbols to measure a country's industrial competitiveness and comprehensive national strength.

The integrated circuit industry is a highly capital-intensive and technology-intensive industry. Recently, the White Paper on Talents in China's Integrated Circuit Industry (2016-2017), issued by the Software and Integrated Circuit Promotion Center (CSIP) of the Ministry of Industry and Information Technology, points out that talents have become the biggest bottleneck in the development of the integrated circuit industry. In addition, due to the characteristics of IC design in the IC industry chain, the reusability of front-end functional design module is good, and each chip of back-end physical circuit design should be specifically implemented. The demand of IC design companies for IC back-end design personnel is significantly higher than that for IC front-end functional design personnel. Therefore, vigorously cultivating IC design talents, especially IC back-end design talents, has become an important training goal for relevant majors in Colleges and universities.

## 2. Situation analysis

Talents, as the first resource for the development of integrated circuit industry, play a vital role in the development of industry. However, there are the following problems in the training of integrated circuit talents in our country at present

Professional development lags behind the industrial process seriously: the biggest demand and talent gap are mainly analog design engineer, digital design engineer and IC design engineer.

The training objectives of counterpart professionals are not clear enough: the existing IC professionals in our country are mainly trained in the electronic science and technology specialty, which has been a wide-caliber specialty, and the specific needs of each module in the IC industry chain are insufficient. Although the characteristics of each university are different, the training specifications are still seriously wrong with the demand for talents in the industrial chain.

The knowledge system deviates from the dynamic demand of industrial development seriously: because the orientation of Applied Undergraduate Talents Training in the IC industry chain is not clear, the school does not know what kind of talents IC enterprises need, so the current curriculum system is still a traditional curriculum, which is quite disconnected from the industrial demand.

### 3. Reform measures

Starting from the extensive investigation of the requirements of IC design related enterprises for the knowledge, ability and quality of IC back-end design talents, and based on the condensed core knowledge and core competence of IC back-end design talents, this paper strengthens the leading role of higher education theoretical research in teaching reform practice, accurately docks industrial needs and industrial resources, strengthens the interaction between industry and learning, and constructs curriculum system. Optimizing the syllabus and curriculum content, strengthening the training links, cooperating in the establishment of an integrated circuit back-end engineering training platform, carrying out the reform of teaching content and teaching mode, constantly updating teaching concepts, constantly deepening the reform practice, while researching, practicing and summarizing, in order to achieve the results of teaching reform. The specific reform measures are as follows:

(1) Combining the superior subject resources of the National Demonstration Microelectronics Institute of Southeast University and the National Research Center of ASIC Engineering Technology, the platform resources of Nanjing Jiangbei Integrated Circuit Industry Service Center and the superior industry resources of Nanjing Jiangbei New Area, an expert Steering Committee for the training of integrated circuit talents is established to guide the training of IC back-end design talents in an all-round way.

(2) Under the guidance of the Committee of Experts on Talents Training, the core knowledge and core competencies required for IC back-end design personnel are discussed and determined by means of division of labor, investigation and summary analysis, and then a new curriculum system and personnel training program are formulated to meet the needs of industry accurately and build a talent training system with deep industrial integration.

(3) According to the new curriculum system, the syllabus is formulated. With the help of high-quality human resources of Southeast University, Nanjing Jiangbei Integrated Circuit Industry Service Center and well-known integrated circuit design enterprises in Nanjing Jiangbei New Area, and the mixed teaching team of excellent young teachers in this school, the relevant courses are taught to achieve the goal of talent cultivation, and the ability of full-time teachers is improved at the same time. Level, build a number of excellent courses, excellent textbooks and so on.

(4) Make full use of the software and hardware resources and platform advantages of the Integrated Circuit Industry Service Center in Jiangbei New Area of Nanjing, establish the IC back-end design engineering training platform, introduce the latest project of enterprises into the talent training course, and form a group of high-quality practical courses and textbooks by the mixed teaching of enterprises and full-time teachers. At the same time, we should strengthen communication and cooperation with well-known integrated circuit design companies in Nanjing Jiangbei New Area, establish a “five in one” talent training base, and promote senior undergraduates to enter enterprise practice and learning.

(5) Promoting excellent teachers to enter enterprises, undertaking actual project development, and promoting undergraduate students to participate in relevant projects and carry out practical training. And use student science association, interest team and other forms to radiate to more students, give full play to the role of transmission, help and lead between students, to ensure full communication and interaction between teachers and students.

(6) In cooperation with the headquarters of Southeast University and Nanjing Jiangbei Integrated Circuit Industry Service Center, we will hold regional and national competitions on the direction of IC design and application, implement educational reform projects and radiate educational reform results to more schools. At the same time, we should organize more students to participate in the same type of intra-school discipline competitions, expand the coverage, lead the students with competitions, promote their learning with competitions, and further strengthen the training of students' practical ability and innovative thinking.

#### **4. Reform effect**

Talent training is market-oriented and oriented to the new economy. Through a series of reform measures, it has achieved good results in the improvement and perfection of professional laboratories, the training of teachers and the improvement of professional level, and the improvement of practical application ability of students majoring in electrical engineering.

According to the needs of market and regional industries, a professional experimental training center with the characteristics of professional reform has been set up and completed. It has one integrated circuit laboratory, two circuit laboratories, one network laboratory, two EDA laboratories, two computer principle laboratories, one automatic control principle laboratory, one engineering training laboratory and six electronic technology laboratories, mainly for professional basic courses and specialties. It also has six innovative laboratories, which mainly meet the needs of college students for innovative entrepreneurship and participation in various electronic competitions.

Attention should be paid to the training and improvement of teachers, and key teachers should be organized to enter universities for further study. At the same time, teachers should be organized to carry out professional skills training and professional scientific research and teaching seminars. The seminars and training are based on the characteristics of the reform and development of the electrical specialty, aiming to effectively improve teachers' performance in Internet of Things, integrated circuit back-end design and related backbone courses. Professional skills and teaching level. On the basis of training and further study, professional teachers declare various kinds of scientific research and educational reform projects, including two successful applications or research projects at the national and provincial levels, two at the municipal level, and several projects of scientific research and educational reform textbooks at the Academy level. They have published more than 20 papers, actively participated in various national, provincial and academy level teaching competitions and won 7 prizes, and comprehensively promoted the major of electrical science. Reform and construction.

On the basis of "cultivation of Applied Undergraduate talents" in independent colleges, we should pay attention to the cultivation and improvement of practical ability of students majoring in electrical engineering. Besides adding practical links in core courses, we also organize and encourage electrical students to actively participate in various professional competitions after class. In 2018, we will organize electrical students to participate in various professional competitions and win two second-class national prizes and one third-class prize. There are 3 first-class prizes, 1 second-class prize and 2 third-class prizes in provincial and ministerial competitions, and more than 20 innovative projects for college students at provincial and college level.

#### **5. Conclusion**

The current situation and problems of the training of Electronic Science and technology specialty are demonstrated in this paper, and establishes the training of integrated circuit talents oriented to the new economy according to the market orientation. With the help of the resources and platforms of parent school and cooperative enterprises, a series of reforms and measures for the training of integrated circuit talents oriented to the new economy have been implemented, and in-depth practical exploration and research have been carried out. Some experience and results have been achieved, which has a good reference and promotion value for the research of integrated circuit talents training.

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