

## Research on the Structure Optimization of Computer Introduction Course in Applied Undergraduate Colleges

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**Abstract:** In view of the present situation and existing problems of computer introduction course structure in Application-oriented Undergraduate Colleges and universities, combined with CCC2002 national standard and through years of teaching practice, this paper puts forward a reform plan of computer introduction course structure optimization, which provides a feasible method for training application-oriented talents with systematic, comprehensive and high quality.

### 1. Introduction

For the students of computer science and technology, introduction to computer is the first professional basic course since they entered the university. How to guide a senior high school student through the study of this course, stimulate students'enthusiasm for learning computer professional knowledge, understand the application field of computer and the direction of subject development, and master computer science and technology? The learning methods of the courses of technology specialty, the main courses of computer science and Technology Specialty in the future, the level to be achieved, and the professional ethics and professional accomplishment that should be possessed, will become the applied technical talents who have the ability to analyze and solve problems. However, around how to achieve such a training goal, the measures taken by various schools are different, so the results achieved naturally vary. In terms of teaching content, some universities equate introduction to computer with "university computer foundation" course for non-computer majors, regard knowledge of computer operation as the main teaching content, and lose the essential attributes of introduction to computer. The article [1] states that some universities have students majoring in computer science and technology in universities. During the semester, the core courses of the major are compressed and summarized, and then explained separately through the teaching method of computer introduction course. The article [2] says that the first way of organizing content is not consistent with the educational goal and function that computer science and technology specialty itself should play for computer introduction, and the second way of organizing content is too broad, which makes the knowledge scope of computer introduction course too broad for freshmen to understand and master all the contents. The article [3] says that even if students understand the knowledge system, professional direction and characteristics of computer science and technology specialty, the introduction course of computer may not fully enable students to understand thoroughly, resulting in embarrassment for the follow-up courses. In fact, mastering this knowledge requires students to learn the follow-up courses step by step in four years of university, not in one move. Therefore, how to design a well-structured and well-structured computer introduction course is very necessary for computer science and technology in Applied Undergraduate Colleges and universities.

In 1991, Computing Curricula 1991 (CC1991), published by ACM and IEEE of the United States, and subsequent CC2001, CC2004 and CC2005, have exerted great influence on the formulation of teaching plans for computer specialty and the standards of personnel training at home and abroad. Document [4] states that this series of courses is to follow up and evaluate the needs of industry and

science and technology for talents in the field of computing and the needs, status, development and existing problems of education and training for talents in the field of education. It also puts forward a guiding undergraduate teaching reference plan for computational disciplines, and gives a clear and feasible plan for computational disciplines. Definition: "Computer science and technology is an algorithmic process for describing and exchanging information, including systematic research on its theory, analysis, design, efficiency analysis, implementation and application." This paper divides the computer and technical knowledge architecture into 14 major fields, 132 knowledge points, totaling 280 class hours. In order to meet the needs of current technology and application, the course also proposes to divide the original computational disciplines into computer science (CS) and computer engineering (CE). Software Engineering (SE) and Information Systems (IS) and Information Technology (IT) are five directions. Relatively independent curriculum system and teaching plan outline are designed for these five disciplines. These curriculum systems play a very important role in standardizing and guiding undergraduate computer education, and have gradually become an important basis and programmatic document for curriculum construction in computer science education circles in various countries. In these courses, the requirements and importance of computer introduction course construction are pointed out in detail, which makes the construction of computer introduction course content become a focus of discussion in the field of computer education. In view of this situation, the Computer Science and Technology Course Research Group of our country, after studying, digesting and absorbing CC2001 in the light of the development situation of universities, industry and social needs in our country, put forward "Chinese Computer Science and Technology Course 2002" (China Computing Curricula 2002). CCC2002, which clearly points out the basic content outline of the computer introduction course, provides a theoretical basis for the construction of the content system of the computer introduction course.

## **2. Clear curriculum teaching objectives, structure curriculum teaching system**

The overall orientation of the school determines the training objectives of each major, and the training objectives of the major determine the teaching objectives of the course. According to the guidance of CCC2002, computer science and technology professionals can be roughly divided into scientific (computer science), engineering (computer engineering and software engineering) and application (information system and information technology). Our Wuyi College regards locality, application-oriented and characteristic as its overall orientation, takes the construction of high-level application-oriented undergraduate colleges with distinctive characteristics as its development goal, and takes the cultivation of high-quality application-oriented talents with excellent ideological and moral character, solid professional foundation, innovative spirit and practical ability as its talent training goal. It is decided that the goal of talents training in computer science and technology is applied. Therefore, the teaching plan and content construction of the computer introduction course should serve the overall goal of training "applied" talents, and take information system and information technology as the core of the teaching system.

The curriculum structure of computer science and technology specialty consists of general education platform, professional education platform, professional direction education platform and practical innovation education platform. The professional education platform includes 11 professional basic courses and 9 professional core courses. According to the research in this paper, the teaching system of computer specialty should focus on the following three aspects to carry out systematic education and teaching.

### **2.1 Basic knowledge education and teaching**

This part constitutes the basic knowledge teaching stage of this course, aiming at forming the understanding of basic computer knowledge and training of basic operation skills. It mainly teaches the history of computer development, application fields, well-known computer scientists at home and abroad, well-known computer companies, data representation, storage and processing of commonly used operating systems, common software, office software, computer hardware composition and

structure, algorithm and programming part mainly explains what algorithm is and how to do it. Solving scientific problems with algorithms, the concepts, methods and software development process of algorithmic design and programming, etc. When describing the binary system, besides the normal explanation of binary system and other concepts, especially the concept of variable VCN proposed by Professor Ye Qiushen of our university [5], so that students can guide different binary systems to produce not only the normal explanation of binary system, but also the concept of variable VCN proposed by Professor Ye Qi. The same effect. At this stage, special attention should be paid to the cultivation of students' hands-on experimental ability. Because freshmen have different foundations and can not talk about too many experiments in theory class, detailed instructions in laboratory and students' self-study after class should be arranged so as to enable students to achieve the intended teaching objectives.

## **2.2 Professional knowledge education and teaching**

This part constitutes the professional knowledge imparting stage of this course, which is an overview of the computer professional knowledge students will learn in the next four years of university, and guides them to know how to learn, how to learn and what is the use in the future. This stage mainly teaches the basic concepts and methods of program design, database basic concepts, data model, SQL language, data management system Access, hackers and data security, computer network applications, information retrieval, future elective courses in professional direction, etc. In this part, we use WYSIWYG software to teach students how to design, debug and run programs quickly. For example, when teaching database, we use Access2010 to create and open database, design and create data tables, design of forms, queries and reports. When explaining modern programming technology, we talk about. NET application, we teach students how to quickly cut into program design and window construction, and stimulate their enthusiasm for program design. And interest, and develop their own simple application software and forms to increase students' sense of achievement. Through the teaching of computer network and security course, we should cultivate students' correct network consciousness, safeguard national security, and pay attention to the educational purpose of cultivating moral connotation and serving the socialist cause.

## **2.3 Application of new technology in education and teaching**

This part is the knowledge extension and teaching stage of this course. It aims to make students understand the application results of computer in the latest research field, have a good foresight for the industry they will be engaged in, plan ahead and cultivate their own professional accomplishment and career planning. The future society will put forward higher and stricter requirements on the knowledge structure of computer application talents. They are required not only to master their professional knowledge, but also to have a broader vision of new knowledge and technology. They can constantly adapt to the changes and expansion inside and outside the specialty, and have a keen sense of innovation and foresight. Good knowledge of Humanities and Social Sciences and team work spirit will lay a solid foundation for future success.

## **3. Effect test**

In order to further achieve the comprehensive cultivation of students' practical abilities, our college computer science and technology specialty participated in IEET certification. The Chinese Institute of Engineering Education (IEET) is the first professional appraisal institution approved by the Ministry of Education in China. Its main business is to plan and implement engineering education (EAC), information education (CAC), technical education (TAC), Architectural Education (AAC) certification and design education (DAC) certification in line with international standards. 546 departments of 84 universities and colleges in China have participated in IEET certification. Table 1 is a statistical table of the results of basic courses for students majoring in computer science and technology. From the table, we can see that the results of introductory computer courses are

relatively good, and the passing rate of the whole grade is much higher than that of other courses by one percentage point.

Table 1 Statistics of basic courses for students majoring in computer science and technology

Serial number	Course name	Credit	Grade average	Grade pass rate
1	Advanced mathematics I	3	76.7	96.5%
2	Advanced mathematics II	4	77.2	84.9%
3	Fundamentals of electronic circuits	3	77.8	93.0%
4	linear algebra	2.5	75.8	94.7%
5	Probability theory and mathematical statistics	2.5	82.7	100%
6	digital logic	3	80.5	100%
7	discrete mathematics	3	69.2	92.1%
8	Introduction to Computer Science	3	76.58	95.9%
9	C language programming	4	65.65	84.4%
	Total average		75.79	94.80%

#### 4. Conclusion

The teaching reform of Applied Undergraduate Colleges and universities is a long-term subject that keeps pace with the times. It has a long way to go. It should not only be in line with the international standards, but also be closely linked with the domestic scientific and technological development, social needs and personnel training objectives. Each college is located in a different geographical position and serves different regions, which will inevitably have an impact on the development and promotion of regional economy. How to make the talents trained in Colleges and universities adapt to the needs of society and the country quickly and well is a big problem for every educator, which must be paid great attention to. After years of teaching of computer introduction and feedback research on graduates, it is found that the cultivation of students' learning habits and world outlook during freshman year is very important, which directly affects the development of University and even the whole life. Therefore, it is very important to attach importance to the teaching and education of computer introduction.

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