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Practical Discussion on Teaching Reform of Signal and System Course in Colleges and Universities

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Abstract: With the advent of the new era, the development of information technology in China has entered a new era. The course "Signals and Systems" is also becoming more and more important in the development of the new era. Signal and system is a professional basic course, and the study of signal and system is something that students majoring in electronic information must pay attention to. Keeping pace with the times, adapting to the changes of the times, can play its own social value in the needs of social development. This article will discuss the reform strategies of signal and system course teaching in colleges and universities for reference.

Keywords: Universities;Signal and system; Curriculum teaching reform; Practice

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In the new era, the course teaching of signal and system needs to keep pace with the times and keep pace with the development of the times, so that students can master the latest relevant knowledge and application skills of signal and system, so that students can put their knowledge and skills into practice during learning and development, so as to better work and life. In college education, students of electronic information majors have great expectations. After all, electronic information technology is inevitable in the development of the times. Students of this kind of majors are future technology-based technical talents. Therefore, students of this kind of majors must master the basic technical discipline of signal and system, so that they can become talents in the future development.

1. Problems in the development of signal and system courses in colleges and universities

"Signal and System" is a professional basic course, which has many teaching contents and is difficult for students to learn. There are a lot of formulas and calculations in the textbooks, and students will encounter various problems in the process of learning. However, teachers are limited by time and energy, and can not meet students' different learning demands. In addition, the teaching method of Signal and System is too simple, and the rigid teaching mode leads to the loss of students' interest in learning. In classroom teaching practice, teachers often prepare some PPT courseware for lectures. Students learn from PPT courseware according to the arrangement of teaching materials and the guidance of teachers. This teaching mode is boring and boring. Students often need to learn and accept knowledge passively. The interest in learning is low. The boring teaching content makes students lose interest in learning. In addition, the teaching effect of Signal and System is not ideal. This course has high requirements for students. On the one hand, students need to master theoretical knowledge, and also need to learn to solve practical problems. In the traditional teaching mode, too mechanized teaching often only involves theoretical knowledge teaching, which can not effectively cultivate students' practical ability, so even if students have strong theoretical knowledge reserves, It is often difficult to apply it to practice and produce the effect of combining theory with practice.

2. Teaching points of signal and system course in colleges and universities

"Signal and system" talks about nothing more than two aspects - "signal" and "system". At the beginning of the lecture, we must thoroughly explain the knowledge structure, application fields and related basic concepts. The basic concepts mainly include the following contents: the definition of signals and systems, the description and classification of signals, the operation of signals, the "impulse" and "step" signals of two basic signals, the nature and classification of systems, and the description of systems. The

explanation of this part should be combined with qualitative analysis and illustration, so that students can understand it thoroughly. For example, the concept of signal can be explained by referring to various common signals in life to deepen students' understanding, especially impulse signal, which has abstract physical meaning, and can be explained by referring to lightning signal in thunderstorm. Explain the concept of system, which can be explained in combination with specific electronic system or mechanical system. It can be a specific circuit or mechanical device, which can be described by differential equation, so that students can understand the relationship between mathematical model and specific system. Through explaining the characteristics of the system, the key content of the course - LTI system analysis is finally introduced, and the students' LTI system analysis method is summarized, so that students can have an overall understanding of the course. In this part of teaching, students should master the basic concepts of signal and system, as well as the key content and knowledge structure of this course. All mathematical methods are only tools for analyzing signals and systems, and subsequent courses are nothing more than using mathematical tools to solve problems [1].

3. Practical strategies for teaching reform of signal and system courses in colleges and universities

3.1 Cultivate learning interest

In the "Signal and System" teaching class for the cultivation of innovative ability, the focus is on cultivating students' interest in learning and allowing students to learn independently. If students can exert their subjective initiative in learning, they will think deeply about what they have learned, so as to deepen and have a deeper understanding of what they have learned. Students will have a deeper memory of these knowledge, and will be more flexible in future applications. In the teaching of Signal and System, many mathematical formulas will be encountered. If students are not focused and not interested in the content of classroom teaching, they are very prone to make mistakes. In addition, if a formula is wrong, it will cause a chain reaction, leading to errors in the whole result. If students often make formula errors, they will have no confidence in learning, and thus learning efficiency is not high, Let teachers also question their teaching ability in teaching. In order to avoid this situation, teachers can use animation demonstration, simulation demonstration, video demonstration and other teaching methods when teaching this course. For example, when explaining the chapter of Sampling Theorem, teachers can demonstrate the sampling and frequency shift characteristics of impulse function through animation; You can also use MATLAB software to demonstrate different sampling intervals to get different sampling results. Finally, you can also use video learning to let students do more in-depth understanding of the sampling theorem.

3.2 Adopt various teaching methods to deepen teaching content

In the teaching class of Signal and System, teachers should carry out targeted teaching according to the specific learning situation of students, and students' learning motivation comes from students' learning interest. Teachers can make students preview the premise by watching online online courses in advance, or make a system by themselves, so that students can have a deeper understanding of what the system is and how the signal responds after passing through the system? By letting students practice, the teacher's question is evolved from this formula, so as long as students can memorize the formula and can freely transform it, they can solve the problem; Teachers can also use the visualization teaching method and use modern information technology, such as multimedia, to display the teaching content vividly, so that students can understand intuitively and remember the formula model learned. For example, teachers can use flexible teaching methods when teaching students to learn the "conductivity random characteristic model", so that students can understand the basic parameters of the model, and then master the calculation formula, and then teachers can give students examples to let students practice. The problems that teachers have are evolved from this formula, So students can solve this problem as long as they can memorize the formula and convert it freely; Teachers can also use the visualization teaching method, with the help of modern information technology such as multimedia, to display the contents of the teaching vividly, so that students can have an intuitive understanding, so as to remember the formula model learned.

3.3 Combination of hardware and software experiments

In the teaching of Signal and System, experimental teaching often occurs, including software experiment and hardware experiment, so teachers can combine hardware and software experiment in the teaching process. When students learn Signal and System, the software experiment is programmed by students themselves, while the hardware experiment is carried out on the test box under the guidance of the teacher. Therefore, both the software experiment and the hardware experiment will have certain difficulties in learning. If the teacher cannot effectively guide the students, then even if the students know the learning skills, they cannot operate well, It is also difficult for students to master these contents [3]. Zero-input response and zero-state response, signal sampling and recovery, and distortion-free transmission system are all hardware experiments. These experiments require very high sensitivity of parameters and equipment. Generally, it is difficult to have a deep understanding of hardware experimental knowledge without making preparations

in advance, and even if the results are completed, they may not be very good, So it is easy for students to lose confidence in learning when conducting hardware experiments. Although the software experiment is somewhat difficult, it can be successfully completed as long as the students can concentrate on the practical operation according to the content taught by the teacher. Because the students in the software experiment program independently, so the students can complete it as long as they grasp the programming skills, exert their subjective initiative, and program gradually according to the programming skills taught by the teacher, Let students gain confidence in learning when programming.

3.4 Establish professional study groups related to the course of Signal and System

Teachers can guide students to set up learning groups independently according to their learning status. Before class teaching begins, teachers can let the group use network and other methods to independently collect relevant knowledge and content, select representatives to actively report in class, and establish evaluation systems among different group members and different groups, so that students and groups can participate in teaching evaluation, Incorporate the teaching results of each group into the exchange, and the teacher finally combs all the knowledge. Group cooperation can significantly cultivate students' ability and sense of cooperation, enhance students' language expression ability and logical thinking, and enhance students' comprehensive ability [2].

3.5 Feedback from students in mixed teaching

When using the hybrid teaching method of combining online teaching and offline teaching, some students feel that watching video learning is not as vivid as listening to the teacher's explanation in the real world in class, unable to concentrate, easy to be distracted, and the interaction is poor, and the information cannot be fed back in time. For conscientious and responsible students, it is sometimes necessary to watch a video of a knowledge point repeatedly to master it.

In the offline "flipped classroom" teaching, students often receive the task assigned by the teacher before class in advance. In order to complete the task, they need to consult a lot of data, which will greatly promote the students' self-learning ability and the ability to consult literature. At the same time, in the offline learning mode of "flipped classroom", they have experienced the new teaching method under the intelligent tools such as "rain classroom", and always have high enthusiasm at the beginning, but with the decrease of freshness, the enthusiasm has declined significantly at the end. How to maintain the students' long-term learning enthusiasm is really a problem.

Students often reflect that the burden of Signal and System course is the heaviest, accounting for a large proportion of learning time. Compared with traditional teaching methods, the teaching effect of mixed teaching has been significantly improved, but students spend more time and energy in the process of mixed teaching. Although the harvest is proportional to the effort, how to improve the teaching efficiency is also a problem worthy of in-depth discussion without increasing the learning burden of students.

4. Conclusion

To sum up, as a basic teaching course for electronic information majors, the signal and system course is the most basic technical support for students of such majors. Therefore, students must pay attention to the study of this course, so as to lay a solid and stable technical foundation for further study. When teaching, teachers should pay attention to teaching methods and teaching quality, so that students can mobilize their subjective initiative and explore independently while learning, so as to master the knowledge and skills of this subject and make adequate preparation for the long-term development in the future.

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