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Design of Ideological and Political Education for the Course of Advanced Operating Systems

Xiaoxiao Liu

College of Smart City, Beijing Union University, Beijing 100101, China

Abstract: This article analyzes the problems and trends in the ideological and political construction of the graduate course "Advanced Operating Systems", deeply studies the educational goals of the course, and explores the ideological value and spiritual connotation contained in the course through restructuring and optimizing the course content. This article outlines the integration points of ideological and political education in the course and designs teaching cases for ideological and political education in the course. Through construction, the integration of ideological and political content into classroom teaching has been continuously improved, helping students to enhance their ideological and moral cultivation and spiritual realm while gaining professional knowledge.

Keywords: Course Ideology and Politics; Political and Ideological Education Case; Advanced Operating Systems.

1. Introduction

The course of Advanced Operating Systems is a degree program for Master's students majoring in Computer Science and Technology. Through the study of this course, students will enhance their understanding of operating system principles, cultivate their ability to solve complex and comprehensive practical engineering problems, and improve their scientific research and engineering practice abilities. The nature of this course and its position in the profession determine that carrying out ideological and political education in the course has unique advantages and important significance [1-3].

The course of Advanced Operating Systems is relatively difficult and lacks student interest. Through ideological and political education, the course can be made livelier and more attractive [4, 5]. However, there are currently few research results specifically targeting ideological and political education in graduate level operating system courses.

2. Goal of Ideological and Political Education

Through the study of this course, the following educational goals will be achieved.

(1) In terms of ideology, it enables students to cooperate with national innovation and entrepreneurship policies, establish the concept of independence and technological innovation, possess the spirit of hard work and self-improvement, and contribute to the development of national system software after mastering the basic theory of system software programming.

(2) In terms of emotions, it enables students to participate in collaborative learning, fully communicate and discuss during task execution, work closely together, and collaborate as a team for project development, possessing a good sense of job responsibility and mission.

(3) In terms of values, it enables students to understand and abide by professional ethics and legal norms in the field of computer science and technology in various practical activities such as software design and computer applications, fulfill responsibilities, enhance students' judgment ability and dialectical thinking, and cultivate great craftsmen.

3. Construction of Course Ideology and Politics

With the goal of realizing the core value system of engineering majors, the course content of Advanced Operating Systems combines the requirements of professional mission, social responsibility, professional ethics, and professional conduct, integrates the core value system of engineering majors into the course objectives, introduces specific "ideological and political" elements into the teaching content, and forms a clear and practical course ideological and political construction plan, as shown in Table 1.

4. Political and Ideological Education Case

By incorporating ideological and political elements such as socialist core values, craftsmanship spirit, innovation spirit, and philosophical thinking into the professional teaching of Advanced Operating System, corresponding ideological and political cases are created using videos, images, texts, and other materials in a subtle and subtle manner.

For example, when explaining the multi-level feedback queue scheduling algorithm, a course ideological and political case can be introduced to organically combine professional knowledge with ideological and political elements, which not only helps students understand the algorithm principles, but also cultivates their sense of social responsibility and values. The name of this case is the balance between fairness and efficiency - the inspiration of multi-level feedback queue scheduling algorithm.

(1) Introduce real cases

When explaining the multi-level feedback queue scheduling algorithm, the background of the development of operating systems in China can be introduced. For example, China is facing foreign technology blockades in the field of operating systems, such as the "Lingjingmen" incident and the Google power outage incident. These events highlight the urgency of China's independent innovation in key core technology fields.

Table 1. Integrating ideological and political education into curriculum design

Serial Number	Contents	Integration of ideological and political elements and carriers
1	The principle and implementation of operating system loading in the boot zone	Establishing innovation consciousness and ability - The development status and trends of computer operating systems at home and abroad
2	The steps to implement an operating system by mixing high-level language and assembly language compilation	Enhancing students' value analysis and judgment abilities: a comparison between advanced languages and assembly languages
3	Kernel object management	Cultivating students' global awareness in teamwork - object-oriented design thinking
4	Management of multi-process and multi-thread	Introducing dialectical thinking in philosophical thought - there is no absolute superiority or inferiority to any scheduling algorithm, there is no best algorithm, only suitable algorithms
5	The principles and implementation of memory usage	Promote the spirit of great country craftsmanship - Virtual memory is a higher-level abstraction based on physical memory, which is difficult and boring in content, but determines the accuracy and efficiency of access for all upper-level applications
6	File system driver	Cultivate students' sense of responsibility and mission - Drivers are compared to "the soul of hardware", "the master of hardware", "the bridge between hardware and systems", etc.
7	File system	Ensuring national security is the responsibility of every individual - file systems and file system security
8	Multiprocessor operating system	Inspiring students' patriotism and dedication - Introducing the core technical features and architecture analysis of Kirin and HarmonyOS operating systems, guiding students to fully understand the importance of autonomous and controllable operation of operating systems

(2) Combining ideological and political elements

The core of the multi-level feedback queue scheduling algorithm is to dynamically adjust process priorities to achieve fair allocation and efficient utilization of system resources. This coincides with the country's pursuit of fairness and efficiency in resource allocation and social governance. Teacher guides students to have group discussions:

- How to balance the fast response of high priority processes and resource acquisition of low priority processes in a multi-level feedback queue?
- How to balance the interests of different groups and achieve the unity of fairness and efficiency in national development and resource allocation?

(3) Explore the problem

- Why can multi-level feedback queue scheduling algorithms balance fairness and efficiency?
- How to adjust queue priority and time slice size according to specific needs in practical applications?
- From the perspective of national development, how can we draw on this balanced thinking to promote independent innovation in information technology in China?

Through the explanation of multi-level feedback queue scheduling algorithm, students not only master professional knowledge, but also deeply understand the importance of balancing fairness and efficiency. This balance thinking is not only the core of the technological field, but also an important concept for national development and social governance. Students will be able to apply this mindset to practical problems in their future studies and work, contributing to the autonomous and controllable development of information technology in our country.

5. Conclusion

The introduction of course ideological and political education design in the graduate course Advanced Operating Systems has achieved significant results in various aspects, mainly reflected in the following aspects.

(1) Significant improvement in students' interest and initiative in learning

By integrating ideological and political elements into the course content, especially through case teaching of domestic operating systems, students' interest in theoretical knowledge and practical operation of operating systems has significantly increased. This teaching method not only helps students better understand the knowledge system of operating systems, but also stimulates their learning motivation and initiative.

(2) Enhance students' practical ability and innovative spirit

The design of ideological and political education courses emphasizes the combination of theory and practice, and enhances students' practical abilities and innovative spirit by introducing practical cases of operating systems. After completing challenging experimental projects, students not only consolidate their knowledge but also enhance their ability to solve complex problems.

(3) Promote the improvement of course teaching effectiveness

From the perspective of teaching effectiveness, students have a high satisfaction with the ideological and political teaching activities of the course, and the quality of the ideological and political content and academic atmosphere of

the course have also been significantly improved. Students' participation, homework quality, and laboratory report level have all significantly improved in the course.

In summary, the application of ideological and political education in the graduate course Advanced Operating Systems not only enhances students' learning outcomes and professional abilities, but also plays an important role in ideological and political education, laying a solid foundation for cultivating high-level talents with both moral integrity and professional competence.

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