

The Ideological and Political Reform and Practice of the Course "Sensitive Materials and Sensing Technology"

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Abstract: "Sensitive Materials and Sensing Technology" is a core course for electronic science and technology majors. According to the core connotation of curriculum ideology and politics, combined with the characteristics of the curriculum, it is proposed to effectively combine ideological and political education with curriculum content to carry out the curriculum ideological and political work of this course. Excavate and expand the ideological and political elements contained in the courses of sensitive materials and sensing technology. Through reasonable teaching plan design, the combination of theory and practice is adopted, and ideological and political elements of the course are added to the sensors that are in daily contact, so as to promote the integration of theoretical knowledge and Ideological and political theory courses are in the same direction and educate people together. After the implementation of the project, the students' interest in the course "Sensitive Materials and Sensing Technolog" has been significantly enhanced, the teaching effect is very good, and the students' grades have been significantly improved.

1. The Ideological and Political Content of the Course

"Sensitive Materials and Sensing Technology" is a core course for electronic science and technology majors. The course content includes basic knowledge of semiconductors, force-sensitive materials and mechanical sensors, photosensitive materials and optical sensors, humidity-sensitive materials and humidity sensors, and magneto-sensitive materials and magnetism[1]. Sensors, thermal materials and thermal sensors, gas-sensitive materials and gas-sensitive sensors, biosensors and surface acoustic wave sensors. At present, teachers pay more attention to the explanation of professional knowledge in the classroom, ignore the ideological and political education of students, and do not organically penetrate the ideological and political content. Therefore, in combination with the ideological and political requirements of the course, the daily application of sensitive materials and sensors is combined with the learning of professional knowledge to stimulate students' personal ideals and sense of social responsibility[2]. To cultivate engineering students' correct world outlook and values, to realize the interest of the course and the realization of morality and cultivating people concurrent effect.

As a professional course, "Sensitive Materials and Sensor Technology" is theoretically strong, and has a lot of technology and application content. On the premise of ensuring the core theoretical knowledge of the course, fully excavate the ideological and political elements contained in the course, and the specific ideological and political content is determined as the following aspects:

(1) In recent years, starting from the domestic and foreign scientific and technological disputes, cultivating students' socialist core values and realizing value leadership[3].

(2) Combined with the excellent national spirit of our country, carry forward the spirit of craftsmanship, and achieve a new height of electronic components.

(3) Combined with the touching deeds of my country's industry elites, emphasizing family and country feelings and social responsibility.

(4) Combined with the wide application of electronic products in our country's life and industrial production, students are encouraged to use the content of this course to think about and improve electronic products to serve the production and life of the people[4].

2. The Practice of Ideological and Political Content

2.1. Starting from the Sino-US Science and Technology Battle, and Discussing Value Leadership in Combination with Domestic and Foreign Industrial Situations

Semiconductor electronic components are the "meter of industry", which is the foundation of the development of the computer, communication, consumer, aerospace, medical and transportation industries. Due to the current Sino-US technology dispute[5], the relevant content, technology, and technical terms in this course have been repeatedly appearing in the news media. The relevant knowledge points in the course can easily resonate with the students, and are also excellent for course ideology and politics. time frame. Starting from the ZTE incident, the Huawei incident, and the Sino-US chip dispute, explaining the current domestic and international situation faced by my country's electronic industry development, cultivating students' electronic product design, manufacturing, testing and application capabilities, and taking the revitalization of my country's electronic components industry as its own responsibility, to improve students' innovative ability. Everyone is familiar with Qian Xuesen. For the cause of the new China, he returned to China after untold hardships to support the development of the new China; when the master of the integrated circuit industry Liang Mengsong was vigorously developing the integrated circuit industry in the country, he devoted himself to my country's integrated circuit enterprises without hesitation, and contributed to the development of my country's integrated circuit industry, contribute my effort.

Guangdong Shengyi Technology Co., Ltd. took 4 years to break through many difficulties and presided over the formulation of IEC61249-2-41 "Limited flammable epoxy cellulose paper/glass fiber cloth copper clad laminate for lead-free assembly" and IEC61249-2 -42" Limited flammable epoxy glass fiber paper/glass fiber cloth copper clad laminate for lead-free assembly"[6], two international standards for lead-free environmentally friendly printed circuit boards, which greatly promotes the industrial upgrading of my country's PCB industry. After the unremitting efforts of several generations of scientific researchers and enterprise engineers, China's electronic components in the military, aviation and other fields are making great strides and moving towards the forefront of the world, but they are still far behind in the civilian and commercial fields. Utilize network resources to broadcast electronic industry technology documentaries to introduce the latest technological development in my country, enhance students' enthusiasm for learning and professionalism, and stimulate students' self-confidence in technology.

2.2. Combined with the Development History of My Country's Optical Fiber, Talk about the Importance of Craftsmanship

As early as in 1966, Dr. K.C. Kao, winner of the Bell Prize in Physics and former president of the Chinese University of Hong Kong, pointed out based on the theory of dielectric waveguides that the high loss of optical fibers is not inherent in itself[7], but caused by impurities contained in the material, and predicts that if the impurity content in the material is reduced, the loss of the fiber can be reduced to 20dB/km, or even smaller. The development of China's optical fiber has also been twists and turns. From the initial purchase of imported optical fiber at a high price, to the development of self-made optical fiber but the need to purchase imported raw materials at a high price, and finally to fully independent production, accounting for half of the world's output. It is precisely because of the rapid development of the optical fiber industry that it has provided a good foundation for the development of my country's communications and Internet. my country's "fiber-to-the-home" project has enabled the development of 4G and 5G to lead the world.

The application of optical fiber sensors in agriculture, chemical industry, aerospace, transportation and other fields brings great convenience and comfort to people's life and work. With the advancement of science and technology, precision agriculture and greenhouses allow people to eat a variety of vegetables in winter, and non-electrical signal measurement of greenhouse environmental parameters controls the presence of optical fiber sensors.

2.3. Combining the Principles of Electronic Devices, Talk about Personal Success and Social Development

In NPN bipolar transistors, the electron current is the main carrier component. The total emitter current I_E of the bipolar transistor is the sum of the electron current I_{nE} injected into the base region from the emitter region and the hole current injected into the emitter region from the base region as I_{pE} , that is, $I_E = I_{nE} + I_{pE}$. The total base current I_B of a bipolar transistor is the sum of the hole current injected into the emitter region by the base region as the sum of the current I_{pE} recombined with the base region, and then subtracts the reverse saturation current I_{CBO} , that is, $I_B = I_{pE} + I_{RB} - I_{CBO}$ [8]. The total collector current I_C of a bipolar transistor is the sum of the electron current I_{nE} injected into the base region from the emitter region and the reverse saturation current I_{CBO} , and then subtracts the current I_{RB} recombined in the base region, that is, $I_C = I_{nE} - I_{RB} + I_{CBO}$. It can be seen that the electron current has experienced two losses, so each current has $I_E > I_{nE} > I_{nC}$. Whether the transistor has amplification benefits, is to discuss whether the bipolar transistor DC has current gain? Personal achievement is like bipolar DC, success is made up of many factors. Not only personal talent, but also acquired efforts, and of course opportunities are indispensable. Only with the combined effect of these factors will success be achieved. The academic performance of students is like this, and so is the development of science and technology in the country. Only by continuously increasing the investment of human resources, material resources and financial resources can science and technology make significant progress. As Academician Zhao Zisen said, "technology is always developing. If we don't move forward quickly, we will fall behind." Enterprises must always have a sense of crisis in order to be effective. To avoid product technical backwardness and obsolescence. As a college student, you should also have this sense of crisis and make good use of your time to study and make continuous progress.

2.4. Combine the Application of Electronic Devices in the Internet of Things to Improve People's Living Standards

Teachers can combine their own experiences to explain the current development of smart homes

and smart factories, ranging from light-sensing and voice-activated lights for getting up in the morning, electric curtains controlled by network commands, smart rice cookers and soymilk machines in the kitchen, electric vehicles controlled by mobile phones, and automatic driving. And enterprise IoT smart production. Let students understand the application of chips and sensors in the smart ecology by playing the video. For example, how does the light-sensing and voice-activated light work, and what knowledge is involved in the course? First of all, the room brightness is insufficient, which needs to be supplemented by turning on the light, and the photosensitive sensor is used to realize the judgment; secondly, the light is turned on through the voice command, and the force-sensitive sensor receives the sound information; finally, the semiconductor triode is used to realize the intelligent control of the brightness of the room light. How to realize unmanned smart factory production? The principle is to use various types of sensors to replace people to make various judgments. For example, in the dark and smart production workshop of mobile phone screens, from glass cutting to mobile phone screen finished product inspection, automated equipment can be used. Each step of processing includes incoming material inspection, processing, process monitoring, defective product screening, etc., without exception. It is completed under the cooperation of multiple force-sensitive sensors, light-sensitive sensors, thermal sensors and real-time communication fiber-optic modules[9].

With the advancement of science and technology, precision agriculture and greenhouses allow people to eat a variety of vegetables in winter. Sensors also exist in the non-electrical signal measurement and control of environmental parameters in greenhouses. The knowledge learned by students can be applied in a wide range of aviation and aerospace, as small as daily application, and encourage the majority of students to work hard to master scientific and technological knowledge and become a qualified socialist successor.

3. Analysis of the Ideological and Political Effects of the Course

Through the introduction of ideology and politics in the course, positive ideological and political elements have been added to the classroom of "Sensitive Materials and Sensor Technology". The students responded well and greatly improved the teaching effect, which is embodied in the following three aspects:

In the classroom, students can not only learn the professional knowledge of the course, but also get the subtle ideological and political guidance, which changes the boring and dull learning atmosphere of professional courses in the past, and makes the classroom more interesting and dynamic.

Introduce engineering cases that are close to students' lives to carry out situational introduction teaching, let students discuss in groups, cultivate a cooperative spirit of unity and cooperation, strengthen the learning of safety awareness, standards and technical specifications, and guide students to pay attention to engineering professional ethics and industry regulations.

By watching the content of optoelectronic products in documentaries such as "Craftsman in a Great Country" and "A Weapon in a Great Country" after class, students' patriotic feelings are stimulated, and students' sense of identity and mission to their majors and even the nation is enhanced[10].

4. Conclusions

The course "Sensitive Materials and Sensor Technology" is a professional course with strong engineering attributes, but its moral education function is also indispensable. The author closely focuses on the training goals of professional talents in teaching, integrates ideological and political content, and organically integrates professional teaching content and ideological and political

elements consciously, planned and step by step. While adhering to the professional orientation, the core socialist values are integrated into the classroom, the curriculum ideology and politics are reflected in the teaching practice, and the students' professional ethics, sense of home and country, and responsibility and mission are cultivated. The ideological and political construction of the course requires the majority of professional teachers to consciously cooperate with ideological and political workers to educate people, build a "big ideological and political" pattern of all-round education for all staff and the whole process, and achieve the goal of cultivating high-quality talents.

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