

Stereoscopic construction and practice of optoelectronic technology

Textbook

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ABSTRACT

It is a professional degree course textbook for the Nation-class Specialty—Optoelectronic Information Science and Engineering, and it is also an engineering practice textbook for the cultivation of photoelectric excellent engineers. The book seeks to comprehensively introduce the theoretical and applied basis of optoelectronic technology, and it's closely linked to the current development of optoelectronic industry frontier and made up of following core contents, including the laser source, the light's transmission, modulation, detection, imaging and display. At the same time, it also embodies the features of the source of laser, the transmission of the waveguide, the electronic means and the optical processing methods.

Keywords: Optoelectronic Technology, Teaching Materials, Multidimensional, Curriculum Teaching

1.INTRODUCTION

With the rapid development of technology in microelectronics, computer and laser, the technology of huge energy and information capacity, high-speed, parallel transmission and processing is coming true and shows that the 21st century is a new era of photons and electrons permeating each other.

Optoelectronic technology is the combination of electronic technology and photonic technology, its advantages arising from the science and technology in optoelectronic information and optoelectronic energy. Today, it plays an extremely crucial role in modern science and technology, economy, military affair, culture, life and so on. Therewith, the optoelectronic industry is the pillar field of competing development all over the world, and it is the main force of a high-tech industry with the characteristic of fast development.

Therefore, in order to fully implement the Nation-class Specialty and the Excellent Engineer Education and Training Program, after 7-year teaching experiments of the provincial boutique sharing courses and aiming at training undergraduates learning in optoelectronic information technology and optoelectronic energy fields, this textbook emphasizes the basic concepts, principles, technical parameters and typical applications of optoelectronic technology. In addition, it closely linked to the current development of optoelectronic industry frontier and made up of following core contents, including the laser source, the light's transmission, modulation, detection, imaging and display. At the same time, it also embodies the features of the source of laser, the transmission of the waveguide, the electronic means and the optical processing methods.

2.TEXTBOOK STYLE

Knowledge contents are fundamental. Some examples are listed, such as the modulation of optical information, photoelectric detection and imaging, and photoelectric display technology, especially the phenomena of relevant effects (such as electro-optic effect) and the characteristics of detection technology. The textbook regards it as an important work that the improvement of the modern students' practical ability, innovation ability, scientific thinking, and the spirits of exploration.

Hierarchical structure is complete. The principle of laser, optical transmission, optical modulation, optical detection, optical imaging, optical display, and optoelectronic devices are all included. It introduces the most of the principle, structure, application technology and new development of common optoelectronic devices. It is integral for matching with teaching syllabus, teaching plans, examination syllabus, lesson plans, teaching PowerPoint, chapter exercises, photoelectric engineering case, simulation questions and other parts.

Engineering case is practical. The book provides the engineering technology application case of each chapter's key knowledge in order to stimulate students' enthusiasm of active learning and practice. The textbook is easy to learn due to its' ample illustrations and reasonable structure.

3.MULTIDIMENSIONAL

In the aspect of teaching materials, the content framework attaches great importance to concepts, principles, parameters, techniques, examples and exercises, including the light source, transmission, modulation, detection, imaging and display, the teaching itself highlights the knowledge points and difficulties.

In the aspect of auxiliary CD, the content framework's main line consists from theory and practice, pictures and animation, videos and explanations, unit exercises. In this way, it forms the core with teaching and counseling, outline and evaluation, the overall and the module. Meanwhile, the learning process consists of theory and derivation, consolidation and simulation.

The textbook is divided into six chapters. They reflect the cores orderly with the laser, the light propagation and modulation, the transmission of waveguide, the light detection, imaging and display, the electronic means and the optical methods. It's overall reflects the basic process of the photoelectric information from generation to display.

4.CURRICULUM TEACHING

4.1 Teaching material and teaching

The teaching material has the following features. First, it focuses on concepts and principles. Second, it combines theory teaching and experiment. Third, it provides case study and engineering application. Fourth, it stimulates discussion and extracurricular savor. Fifth, it coaches essentials and knowledge points. Sixth, it emphasizes application and comprehensive quality. Seventh, it highlights students' personality and strengthens their common. Eighth, it adds the usual check's frequency and weakens the final exam's decisive effect.

4.2 Teachers and teaching

The tasks of teaching require a major speaker (Professor), an instructor (Engineer) and an assistant (graduate or young

teacher)to finish. Teachers guide students pour attention into Pre-lesson preparation, classroom learning and after-school practice. They evaluate students according to a complete system, which consists with the usual homework performance, additional technical activity awards, as well as half-term and final examination scores.

4.3 Process and teaching

The textbook's construction and practice are based on *Optoelectronic Information Science and Engineering Personnel Training Program*, *Excellent Engineer Education and Training Program Common Criteria*, *Engineering Certification General and Electrical Professional Standards*, *Ordinary Colleges and Universities Undergraduate Professional Construction Evaluation Index*, and *Nation-class Engineering Practice Center Implementation Plan*. In addition, this textbook's main procedure is constructed commonly with the training direction, reference materials, teaching syllabus, teaching teams, teaching process. Different stages have their own characteristics. Usually, the homework tasks are flexible. In half-term, the examination focuses on the basic knowledge. In the period of practice, science and technology activity subject choices are practical. In the final, the assessment helps students strengthen comprehensive ability.

Teachers and students interaction reflect the principle of "People-oriented, Education-oriented". Teachers help students to identify the reasons why failed in exams for positive guidance and communication in normal time, and provide extra summer review counseling. With the application of provincial boutique sharing courses, as well as the *Optoelectronic Technology* and *Fundamentals of Optoelectronic Technology*, students strengthen their self-learning ability effectively.

5.CONCLUSION

The implementation of this textbook has positive impacts. The basic requirements which made by the Ministry of Education for personnel training are carried out effectively. In addition, students have more interests in the course because the teaching materiel brings the front-edge knowledge of optoelectronic technology to them. Meanwhile, teachers use the usual extra-curricular counseling, photoelectric science and technology activities, and curriculum evaluation, so as to help students how to learn. By the way, those students who feel confused in study make huge progress under the helps of individualized counseling from their teachers.