Biomedical Engineering Course Study based on mechanical drawing and computer graphics

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Abstract

Course Study is one important part of professional development, an important guarantee for the personnel quality and the inherent requirement of subject construction and development. From teachers as a starting point to build on biomedical Engineering curriculum with "mechanical drawing and computer graphics". Analysis of the medical equipment manufacturing and maintenance professional connotation and teaching plan. The significance of the curriculum was elaborated. We research construction strategy with the combination of biomedical and engineering. The course status was presented in the professional. Teaching ideas and methods were proposed. That is for the course reform to lay the foundation.

Keywords

Medical Engineering, course Study, mechanical drawing and computer graphics.

1. Professional Teaching Plan Analysis

Professional of medical equipment manufacturing and maintenance are key characteristics for the university, more than 50 years of development history. In the professional development of several decades, has accumulated a wealth of experience in personnel training and has cultivated more than 6,000 graduate with highly skilled. The professional cultivating graduate for medical equipment production, management and application units, with medical equipment manufacturing and maintenance of basic knowledge and skills to engage with surgery and first aid equipment, clinical laboratory analysis equipment, optical instruments and other medical products of local design and manufacture, installation, quality inspection, technical maintenance, clinical management and marketing services work, with career development based on high-quality technical skilled personnel. Professional implementation teaching model of Medical Engineering internships combination. In school training is professional environment simulation. The real situation internship as the starting point in company, the implementation of Biomedical Engineering combine internships teaching mode. Theoretical teaching system in accordance with professional-oriented job vocational capacity needs to cultivate aided design of medical devices typical products, manufacturing, quality testing, clinical and other basic knowledge and professional skills as the core, emphasizing the organic integration of the basic medical knowledge and light, mechanical, electrical technology. The establishment of training and career development has a good foundation based on occupational post ability theoretical teaching system. Developing a high-quality technical skills talent as the goal of teaching practice, the skills training throughout the teaching process. By students to master the basic knowledge of the engineering of the training professional skills: ① professional theory stage, through practical training to master the basic skills of professional medical equipment; ②comprehensive professional stage, through off-campus post teaching training, graduation practice other models integrated use skills to enhance job ability. Skills development in line with the overall progressivity, education law gradually deepened. Ultimately achieving students job skills and literacy cultivation purposes. At the same industry practice by project type training courses, school training and off-campus internships integrated in such a progressive curriculum system, so students enrolled at the

beginning, we begin to understand the industry, professional familiar with, and then gradually into the industry, highlighting both practice capacity-building, and follow the teaching of law students' professional skills and literacy levels will be improved significantly, thereby enhancing the employability and competitiveness, and ultimately corporate job demand Zero docking.

Training model to develop high-quality technical skills talent as the goal of teaching practice medical engineering combination, relying on industry-oriented job training model. Construction based curriculum system working process, in order to cultivate medical equipment typical products manufacturing, quality testing, clinical and other professional skills as the core, according to the Medical devices post occupation capacity needs, emphasizing the basic medical knowledge and light, mechanical, electrical and applied technology organic integration, the establishment of professional curriculum system based on the work process.

2. Mechanical drawing and computer graphics courses in the professional

Medical equipment manufacturing and maintenance knowledge structure: (1) surgical emergency equipment, clinical laboratory analysis equipment, medical optical instruments and other medical equipment, working principle and method of operation; (2) the relevant medical device manufacturing, assembly, commissioning and basic knowledge of maintenance; (3) to master the skills typical medical equipment and routine maintenance methods, with a strong practical ability; (4) to master the medical device component design method, with CAD / CAM software graphics capabilities; (5) have medical equipment marketing capabilities.

Which is in accordance with the "Medical Engineering internships combination" teaching mode to cultivate the typical medical device product manufacturing, quality testing, clinical and other professional skills as the core, according to the medical device jobs requirement of professional competence, stressed the organic integration of basic medical knowledge and light, mechanical, electrical and applied technology, the establishment of curriculum system based on the work process. And industry, enterprises in developing professional standards related to medical devices in the field, training for manufacturing enterprises, medical institutions, enterprises engaged in the production, installation, operational use highly skilled professional personnel, technical maintenance and technical management.

2.1. Mechanical drawing and computer graphics objective of the course.

Through this course, students in the training process interpret blueprints, drawings, and gradually master the mechanical pattern of reading methods and drawing skills, with relevant work in theoretical knowledge and professional competence of mechanical drawing and computer graphics, and medical device manufacturing maintenance and other related positions at the beginning, mid-career the corresponding requirements of the standard. Students can achieve the tasks and objectives: learn projection; correctly drawing pattern based on national standards; use instruments and CAD drawing software commonly used standard parts and common parts, all kinds of parts and assembly drawings; energy mapping parts and assemblies . In terms of skills, to computer-aided mechanical design draftsman (four) the relevant requirements of the national vocational qualification standards and the National Training Center CAD computer graphics (Intermediate). In terms of professional competence: (1) you can use various tools detachable parts or machine can use the drawing tools to draw engineering drawings, measurement tools can be used to zero mapping component; (2) it is can correctly refer to the "mechanical drawing national standard", "mechanical components Handbook", and draw the mechanical design in accordance with national standards; (3) the culture space imagination, preliminary and innovative ability of space concept; (4) culture drawing and reading mechanical design capabilities. In the process of capacity: (1) having a better learning new knowledge and skills capacity; (2) has a good ability to analyze and solve problems; (3) includes a Find "mechanical drawing national standard" and "Mechanical Part design Handbook "capability information; (4) obtained through self-study of new technologies, access to information networks, such as the use literature; (5) self-control and management capability and capacity to develop work plans. In terms of social competence: (1) has a good work ethic and scientific

innovation; (2) has a better ability to learn new knowledge and skills; (3) has a strong organization and team collaboration capabilities, in particular in ability to work with others, cooperation and exchange and consultation; (4) has a strong professionalism, ethics and social responsibility.

2.2 Description mechanical drawing and computer graphics Learning Areas.

The fields of study the course "Mechanical Drawing", "Descriptive Geometry", "Computer Graphics" and "tolerance and cooperation," and many other courses organically combine curriculum content optimized combination, we developed a project based teaching "mechanical drawing and computer graphics" course, the knowledge, skills, be able to integrate point in the process to complete the project work. The Engineering Students compulsory important technical basic course is to train students for the profession of emotional and important way of mechanical professional interests and hobbies, but also each engaged in engineering and technology-related professional and technical personnel must master basic skills, in order to strengthen the machinery mapping capabilities, machining capacity, process planning as the core curriculum in vocational ability, in the trunk, the cornerstone position.

2.3 Mechanical drawing and computer graphics the nature and role of curriculum.

"Mechanical Drawing and Computer Graphics" course thaw "Geometry", "Mechanical Drawing" and "Computer Graphics" as one, in the "Essential and Enough" under the premise of integration of teaching content, strengthen the drawing, the ability to interpret blueprints, medical core Curriculum equipment manufacturing and maintenance group. "Mechanical drawing and computer graphics" is "language engineering", engineering technology is a graphical text, is engaged in engineering work that every professional must master the professional knowledge and skills application. This course knowledge, not only is the need for a subsequent course of study, students after graduation is engaged in engineering work in the necessary skills. The curriculum in the first and second semester.

3. Mechanical drawing and computer graphics course significance

"Mechanical drawing and computer graphics" course study through reflection professional training programs, professional status in the course and pursue the issue, meaning the process of curriculum. It is not only the need to develop general education curriculum theory, but also the need to promote vocational education courses on development. Which have the following meanings: (1) teachers' professional development needs. Teachers actively involved in teaching and research on teaching practice, consciously learning theory, update concepts of education, scientific research with teaching and research, teaching and research in order to promote reform, to improve the quality of the teacher's own benefit. "Teachers participate in educational research, it is an important way to improve their quality." Needs (2) to solve practical problems. The main research is confusing to solve the problem found in education, teaching and encountered. (3) Help to develop rigorous style of work. Rigor of research, also contributed to the education of teachers, teaching more scientific and systematic. (4) Contribute to the formation of consciousness research and teaching. Teaching and research activities into practice the concept of teacher education, and consciously to improve their means of education and teaching methods, teaching reflection.

Issue-driven, action research is the teachers' self-development, the basic method of self-improvement, teacher professionalism requires us to research and education, we must change from "pedagogue" to research teachers. By school curriculum reform trends, select medical equipment manufacturing and maintenance as the research object, tries that "mechanical drawing and computer graphics" course of development in line with professional personnel training programs and curriculum development comprehensive method, designed to effectively enhance students' learning professional and leading the resistance.

4. Curriculum of new ideas and methods

Thinking course is to study mechanical drawing and computer graphics teaching and practice of organic combination of features. Mechanical drawing and computer graphics project teaching also

lay the foundation for the medical device manufacturing and maintenance of a professional group of follow-up courses and future development.

4.1. The basic concept of curriculum design.

(1) Process Orientation Course

Construction of service for the purpose of employment-oriented, reflecting the work process-oriented philosophy in curriculum design, according to "project teaching" design tasks, the selection and arrangement of teaching content to follow the principles of occupational and cognitive rules, tasks from simple to complex, knowledge points interspersed in the project, the content Deep. Students through the integration of theoretical and practical work, the learning process, not only has the basic professional ability, and Students 'Ability to solve practical problems and improve the students' job responsibility and sense of accomplishment.

(2) action-oriented teaching philosophy

Teaching follows the action-oriented philosophy students to work and learn, learn on the job, working process and the learning process unite to break the "subject-centered" curriculum concepts of knowledge, establish a "working process as the core of the task-driven" teaching philosophy, students are the main body of teaching, teachers should establish the idea of combining medical engineering, medical products through the typical "project teaching" teaching model that allows students to simulate into the medical device industry, has become the protagonist of the classroom, students speak more , opportunity to show themselves, to improve students' motivation to learn and the ability to express medical cartography equipment, the real implementation of the "student-centered, student services," the combination of Biomedical Engineering Education.

(3) Multiple Intelligences Student View

Reflected in the curriculum design concept of multiple intelligences of students, according to the characteristics of vocational students, individualized, so that students in "learning by doing, learning to do", give full play to students' thinking in images strong advantage, by doing the project, complete multiple tasks so that students feel the joy of success at the same time develop their initiative and innovation potential, personality development, the pursuit of greater success.

4.2. The new method of implementation of the curriculum.

Mechanical drawing and computer graphics with a project teaching practice, autonomy, development, integration, openness and so on. Practicality is a theme and let the mechanical drawing typical medical device project in close contact, so that students have more relevance and usefulness in the course of study; autonomy is to allow students to choose the content and presentation to decision-making project and according to their own interests, students capable of autonomy, freedom to learn, so as to effectively promote the integration of students to learn further professional courses; the development of a long-term project with the phase of the project of integration, to achieve the cognitive processes of medical equipment professional education goals; synthesis is a medicine and engineering of and the use of cross-drawing of capacity; openness is reflected in the drawing course students around themes explored ways, means and display, evaluate diversity and selectivity. Evaluate teacher performance characteristics reflected in project teaching students the ability to focus on process development in project activities, including the evaluation of students to participate in activities of the various aspects of the performance and quality of operations. Mechanical drawing and computer graphics project of this course is to provide the foundation for the follow-up and the introduction of professional courses can be well carried out.

Teaching (teaching and assessment methods form): The project teaching, 4 hours per week, two hours theory, 2 hours operating, plus 2 hours mapping a gear reducer parts, etc., usually using job evaluation, board Figure score, doing the project work report card, operating on the end of exams and final written examination, focusing on the learning process, dilute the test results. Reform of teaching methods and teaching methods: classroom and training room as a whole, the implementation of vocational school training simulation environment; typical products to medical equipment (breathing machine, anesthesia machine) a key component manufacturing, installation and commissioning,

performance testing, clinical use, technology management job skills as the core, "the work process, project-oriented" teaching method, developed with the ventilator, anesthesia machine key components of the project as a carrier of the curriculum. Project of specific Examples are as follows: 1 clear project task: Teachers propose task students discuss Consideration; 2 plan: teachers to give instruction and guidance; 3 implementation plans: learning experience, group practice, a clear division of labor, collaboration; 4. check assessment: student self-assessment, teacher evaluation; teacher evaluation 5: student's theory and its application of balanced development.

5. Conclusion

Biomedical engineering course study based on "mechanical drawing and computer graphics" is the need to promote professional development. It can enhance students' interest in the medical device industry professional, meanwhile pave the way for follow-up medical equipment import-related courses. It is provide experience and learn for research other professional courses.

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