Design and Construction of the Teaching Lab on Medical Physics

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Significance

- To meet the needs of the rapid development of medical science and technology
- The need for improving the physical diagnosis and treatment ability of doctors in the future
- Construct a training platform for students to develop the ability of applying physics
- Enhance the awareness and ability for innovation in interdisciplinary area

Learning Goals

- To master the ideas and methods of innovation in interdisciplinary area
- To master the mechanism of physiological and physical quantities and the technology of modern measurement and analysis
- To master the physical principle and technical method of modern medical imaging
- To master the characteristics and methods of physical parameters of biological materials

Teaching Contents

Module 1: Generation and measurement of the biophysical parameters
- The simulation and assembly of digital blood pressure meter
- Auditory threshold and measurement of auditory threshold curve
- ECG technique, human potential measurement and signal processing
- Eye optical parameters simulation
- Measurement of respiratory physical quantities

Module 2: Medical imaging physics principle
- Basic principle of ultrasonic imaging (velocity measurement, A type and B type ultrasonic principle experiment)
- Basic principle of X ray imaging (imaging parameter, the relationship between physical quantities and image contrast)
- Basic principles of nuclear magnetic resonance imaging

Module 3: Measurements of the physical parameters of biological materials
- Measurement of Young's modulus of artificial bone
- Viscosity measurement of the commonly used liquid medicine
- Focal length measurement of optical lenses
- Measurement of surface tension coefficient of the commonly used liquid medicine
- Measurement of optical activity and concentration of the commonly used liquid medicine

Module 4: inquiry-based laboratory work – Medical application of physical experiment technology

Outcomes

- Improve students' knowledge of cross application ability, stimulate the students' creative desire.
- Students put forward the new ideas of physics applying in medicine, and some of then designed their own experiments.
- Excellent final presentation beyond expectation
- Teaching content and teaching mode were praised by students

http://phylab.fudan.edu.cn