



King Saud University
College of Applied Medical Sciences
Department of Biomedical Technology
BMT367 Hospital Safety 2 (1-1-0)

Current Instructor: Eng. Mohammad Shaaban and Eng. Abdullah BenOmran

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Textbook(s) and/or Other Required Materials:

Primary: Medical Instrumentation: Application and Design, John G. Webster.

Recommended: Hand Book of Modern Hospital Safety, William Charney, Lewis Publishing, 1999

An Introduction to Radiation Protection, Alan Martin, Sam Harbison, 2006.

Course Description (catalog): This course covers safety issues within healthcare facilities. It mainly focuses on electrical safety for medical devices. This is covered on the level of medical device design and on the level of power distribution system. Other safety issues such as radiation protection and medical waste management are covered as well. In the practical, students are trained to use the electrical safety analyzer to perform safety tests such as leakage current, ground resistance, insulation resistance, patient leakage current ...etc.

Prerequisites: None

Co-requisite: None

Course Type: Mandatory

Course Learning Outcomes:

Upon completing BMT367, students should have the following capabilities:

- Understand the effect and dangerous of electricity on human body.
- Understand methods of protection from electrical shock.
- Understand effects of ionizing radiation on human body.
- Understand methods of protection from radiation.
- Understand the dangerous of medical wastes.
- Understand methods for treating medical wastes.
- Use safety analyzer to perform electrical safety tests.

Student Outcomes Covered by Course:

a. an ability to select and apply the knowledge, techniques, skills, and modern tools of biomedical technology to include the application of circuit analysis, analog and digital electronics, microcomputers, biomechanics, biomedical instrumentation systems, and safety in the building, testing, operation, and maintenance of biomedical equipment.

b. an ability to select and apply a knowledge of mathematics, chemistry, physics, and biological sciences, engineering, and technology to building, testing, operation, and maintenance of biomedical equipment and the ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of biomedical systems.

c. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.

Understand methods of protection from radiation, the dangerous of medical wastes, methods for treating medical wastes. Use safety analyzer to perform electrical safety tests.

d. an ability to analyze, design, and implement biomedical systems, components or processes for broadly-defined engineering technology problems appropriate to program educational objectives.

e. an ability to function effectively as a member or leader on a technical team.

f. an ability to identify, analyze, and solve broadly-defined biomedical technology problems.

g. an ability to apply written, oral, and graphical communication in both technical and nontechnical environments; and an ability to identify and use appropriate technical literature.

h. an understanding of the need for and an ability to engage in self-directed continuing professional development.

i. an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity.

j. a knowledge of the impact of engineering technology solutions in a societal and global context and an understanding of the clinical application of biomedical equipment.

Ability to recognize common hazards in hospitals, to deal with hazards through containment or limitation, to perform safety tests for medical equipment using the safety analyzer.

k. a commitment to quality, timeliness, and continuous improvement.

Understand the effect and dangerous of electricity on human body, methods of protection from electrical shock, effects of ionizing radiation on human body.

Major Topics covered and schedule in weeks:

Electrical Safety: Tissue response to electrical current, Electrical shock, Leakage current and leakage current limitation, Different human body impedance, Protection: Power distribution, Equipment design, Grounding system, Isolated patient connections, Isolated power-Distribution system, Ground-Fault circuit Interrupters (GFCI)

Radiation safety: Ionizing and non-ionizing radiation, Effects caused by different doses of radiation on humans, Major sources of radiation exposure, Dose limits

Medical waste: Infectious waste, Hazardous waste, Radioactive waste, Waste collection, Disposal technology, Incineration, Autoclaves, Mechanical/Chemical Disinfection, Microwaving Irradiation

Special topics related to safety: Micro-biological contamination control in hospitals, Needlesticks, Electrocautery Smoke, Safe use of Ethylene Oxide in Hospitals, Monitoring Aldehydes, Trace Anesthetic Gas, Respiratory protection in Hospitals