Western Technical College

10605209 BioMed Codes/Standards/Procedures

Course Outcome Summary

Course Information

Description	This course is a study of the major requirements and procedures a HTM (Healthcare Technology Management) professional follows while supporting and maintaining medical equipment. It includes investigating relevant codes, guidelines, regulations, applicable agencies, and the clinical environment. Biomedical procedures are studied and implemented, including performing equipment maintenance procedures PM (Preventative Maintenance) and some minor repairs if available. Activities & tours are carried out at local clinical facilities (when available) and training facilities.
Career Cluster	Science, Technology, Engineering and Mathematics
Instructional Level	Associate Degree Courses
Total Credits	3
Total Hours	72

Pre/Corequisites

Prerequisite	10605100	Intro to BioMed Technology
Prerequisite	10660116	DC/AC 2

Textbooks

No textbook required.

Success Abilities

1. Cultivate Passion: Expand a Growth-Mindset
2. Live Responsibly: Develop Resilience
3. Live Responsibly: Embrace Sustainability

4. Refine Professionalism: Act Ethically
5. Refine Professionalism: Improve Critical Thinking
6. Refine Professionalism: Participate Collaboratively
7. Refine Professionalism: Practice Effective Communication

Course Competencies

1. Adhere to the codes and accepted standards in the performance of biomedical duties.

Assessment Strategies

1.1. Homework assignments
1.2. Written objective tests - score 50% or higher

Criteria

You will know you are successful when

1.1. You look up codes and standards in classroom resources.
1.2. You demonstrate adherence to the NFPA Guidelines in lab activities with minimal instructor correction.

Learning Objectives

1.a. Identify the agencies responsible for creating the accepted codes and standards in the biomed field including but not limited to NFPA, Joint Commission, IEEE, and governments.
1.b. Utilize appropriate documentation such as published codes, trade journals, and laws to investigate the codes and accepted standards.
1.c. Demonstrate adherence to HIPAA regulations.
1.d. Demonstrate adherence to the published codes and standards related to the biomedical field.

2. Explain biomedical equipment activities.

Assessment Strategies

2.1. Homework assignments
2.2. Written objective tests - score 50% or higher

Criteria

You will know you are successful when

2.1. You select the correct biomedical activity for sample situations

Learning Objectives

2.a. Explain incoming inspection.
2.b. Explain planned maintenance.
2.c. Explain performance/quality assurance.
2.d. Explain equipment repairs.
2.e. Explain equipment inventory.
2.f. Explain test equipment verification.

3. Perform PMs (Planned Maintenance) on medical equipment by fulfilling the four components (physical inspection, functional inspection, maintenance actions as required, and safety test).

Assessment Strategies

3.1. Homework assignments
3.2. Written objective tests - 50% or higher
3.3. Skill Demonstration

Criteria

You will know you are successful when

3.1. You practice inspecting medical equipment in lab activities in a group setting
3.2. You demonstrate basic tests on medical equipment using test equipment in a lab evaluation with minimal instructor assistance
3.3. You demonstrate a safety test on medical equipment using a safety analyzer in a lab evaluation with minimal instructor assistance

3.4. You complete any required preventative maintenance in medical equipment being inspected.

Learning Objectives

3.a. Physically inspect medical equipment
3.b. Utilize resources such as manuals, research, and instructor information to obtain operation and performance requirements on specific medical equipment
3.c. Operate medical equipment
3.d. Determine acceptable output values for medical equipment from listed specifications and tolerances
3.e. Perform basic tests (current, voltage, waveform, US power, pressure, temperature) on medical equipment using test equipment (DMM, oscilloscope, wattmeter, pressure meter, thermometer)
3.f. Determine if observed and measured functional performance of medical equipment meets requirements
3.g. Perform Safety tests on medical equipment using a safety analyzer
3.h. Explain labels and symbols on medical equipment
3.i. Perform maintenance on medical devices as specified by instructor or documentation if required.

4. Document HTM activities to industry standards.

Assessment Strategies

4.1. Homework assignments
4.2. Written objective tests - 50% or higher

Criteria

You will know you are successful when

4.1. You practice documentation of tested medical equipment in lab activities

Learning Objectives

4.a. Explain the aspects of a medical equipment database
4.b. Utilize correct grammar and professional language on all documentation
4.c. Write clear and precise notes regarding medical equipment performance
4.d. Record appropriate measured values on paper forms or electronically
4.e. Record inspection results on paper forms or electronically
4.f. Update stickers on equipment with inspection information

5. Investigate the equipment and operations of various clinical locations.

Assessment Strategies

5.1. Homework assignments
5.2. Written objective tests - score 50% or higher
5.3. Clinical Site Tours or videos write-up

Criteria

You will know you are successful when

5.1. You attend the clinical tours or watch the videos
5.2. You follow all requirements on clinical tours with minimal instructor correction
5.3. You log the information obtained on clinical tours or videos

Learning Objectives

5.a. Follow clinical site rules
5.b. Adhere to the HIPAA law
5.c. Dress appropriately in clinical environments
5.d. Conduct oneself appropriately in clinical environments
5.e. Explain the operation of various clinical environments such as the OR, General Hospital locations, Hospital Biomed shop, Imaging suites, and Special treatment areas such as dialysis
5.f. Explain adherence to aseptic techniques in the OR

6. Explain electrical aspects of medical equipment.

Assessment Strategies

6.1. Homework assignments
6.2. Written objective tests - score 50% or higher

Criteria

You will know you are successful when

6.1. You demonstrate awareness of electrical components of medical equipment in lab activities
6.2. You verify adherence of medical equipment to electrical design in lab activities

Learning Objectives

6.a. Explain the electrical power distribution system
6.b. Explain power backup in clinical locations
6.c. Explain isolation transformers
6.d. Explain electrical macro and micro shock
6.e. Explain the function of fuses and breakers
6.f. Explain medical equipment designs that are commonly in place to prevent any shock possibility
6.g. Explain lock-out tag-out procedures
6.h. Explain battery management procedures including maintenance, testing, and disposal/recycling

7. Maintain power connections such as plugs, outlets, and cables.

Assessment Strategies

7.1. Homework assignments
7.2. Written objective tests - score 50% or higher
7.3. Skill Demonstration

Criteria

You will know you are successful when

7.1. You practice wiring plugs in lab activities
7.2. You practice testing outlets in lab activities

Learning Objectives

7.a. Identify the American and European standards for power plugs and outlets
7.b. Identify hospital grade power plugs and outlets
7.c. Look up unknown power plugs and outlets
7.d. Identify the components of power connections
7.e. Practice wiring American and European hospital grade power plugs
7.f. Identify strain relief devices
7.g. Demonstrate correct insertion and removal of power plugs
7.h. Demonstrate testing 120Vac outlets

8. Apply biomedical terminology and acronyms.

Assessment Strategies

8.1. Homework assignments
8.2. Written objective tests - score 50% or higher

Criteria

You will know you are successful when

8.1. You utilize correct notations on documentation of testing medical equipment in lab activities
8.2. You look up unknown jargon using industry publications in lab activities

Learning Objectives

8.a. Identify the governing agencies
8.b. Identify the codes and standards
8.c. Define electrical terminology
8.d. Define acronyms related to the codes and standards
8.e. Define commonly used jargon on medical equipment documentation

9. Explain laser operation and safety.

Assessment Strategies

9.1. Written Objective Test
9.2. Self-Assessment

Criteria

You will know you are successful when

9.1. You describe different types of medical lasers.
9.2. You identify different types of PPE that would be used with different lasers.

9.3. You explain how to use PPE in the laser environment.
9.4. You explain appropriate safety procedures to follow in the laser environment for different laser types.

Learning Objectives

9.a. Describe the dangers lasers can pose.
9.b. Identify different types of medical lasers by name, appropriate categories, functions, and applications.
9.c. Explain the use of the correct PPE for different types of lasers.
9.d. Explain the correct safety procedures for different types of lasers.

10. Explain the internal building blocks of medical equipment.

Assessment Strategies

10.1. Classroom Participation.
10.2. Lab Participation.
10.3. Lab Assignment.
10.4. Homework Assignment.
10.5. Written objective Test.

Criteria

You will know you are successful when

10.1. You are able to explain what a block diagram is and how it is used.
10.2. You explain the concept of a complicated system being broken down into smaller less complex parts.
10.3. You are able to explain the purpose of different functional blocks such as but not limited to amplifiers, filters, isolation, memory, displays, and printers.
10.4. You are able to identify types of technology utilized to accomplish functional blocks including but not limited to electronics, mechanics, hydraulics, pneumatics, and computer technologies.
10.5. You analyze a medical device and list the building blocks for that medical device.

Learning Objectives

10.a. Explain block diagrams.
10.b. Explain how devices can be broken down into a number of functional blocks.
10.c. Explain the purpose of different types of functional blocks.
10.d. Identify different ways to create functional blocks.
10.e. Recognize which functional blocks create specific medical devices.