Western Technical College

10605203 On-Site BioMedical Clinical Experience 1

Course Outcome Summary

Course Information

Description	The focus of this course is to practice typical HTM (Healthcare Technology Management) tasks in a clinical environment while furthering the knowledge base related to medical equipment. Laboratory sessions occur primarily in an actual or simulated hospital environment accomplishing inspection, maintenance, documentation, and troubleshooting and repair of medical instrumentation. Specific operational, calibration, preventive maintenance, and repair procedures as prescribed by the manufacturer and regulatory agencies are implemented. Professional job search skills are practiced, and an internship procured or a HTM capstone project approved. Various devices and concepts are also researched.
Career Cluster	Science, Technology, Engineering and Mathematics
Instructional Level	Associate Degree Courses
Total Credits	3
Total Hours	90

Pre/Corequisites

Prerequisite	10660106 Basic Soldering
Prerequisite	10605121 BioMed Codes/Standards/PM/QA OR 10605209 BioMed Codes/Standards/Procedures
Prerequisite	Background check, mandatory education, and host site immunization/health screening requirements

Textbooks

Biomedical Device Technology Principles and Design. 2nd Edition. Copyright 2016. Chan, Anthony Y.K. Publisher: Charles C. Thomas. **ISBN-13**: 978-0-398-09083-8.

Introduction to Biomedical Engineering Technology. 4th Edition. Copyright 2023. Street, Laurence J. Publisher: Taylor & Francis. **ISBN-13:** 978-0-367-68700-7. Required.

Learner Supplies

Safety glasses with side eye protection that meet Z87 OSHA guidelines. **Vendor:** Campus Shop. Required.

Success Abilities

1. Cultivate Passion: Increase Self-Awareness
2. Refine Professionalism: Improve Critical Thinking
3. Refine Professionalism: Participate Collaboratively

High Impact Practices

1. Work-Based Learning: this course applies your learning to your desired profession by working in industry placements such as internships, practicums, clinicals, or co-ops.

Program Outcomes

1. Manage medical equipment and systems
2. Identify the function and operation of various types of imaging equipment
3. Problem-solve electronic circuits and systems
4. Demonstrate a competency with computers and networks used in medical equipment
5. Apply principles of anatomy, physiology, and medical terminology
6. Demonstrate safety precautions and practices with medical equipment
7. Demonstrate professionalism

Course Competencies

1. Comply with the host-site requirements for clinical, internship, and/or job.

Assessment Strategies

1.1. Clinical/Internship/job site orientation
1.2. Clinical/Internship/job site requirements submissions

Criteria

You will know you are successful when

1.1. you collaborate with cooperative site pairing in a timely manner
1.2. you meet additional site-specific requirements for candidacy (i.e. orientation training, background check, flu shot, TB screening, immunization records, etc.) as required in a timely manner (before term for clinical and within for internship/job).
1.3. you investigate and apply (real or simulated) for HTM/biomed internship or position at an approved host-site.

Learning Objectives

1.a. Adhere to clinical site requirements prior to start of course.
1.b. Investigate internship/job opportunities that are available.

1.c. Communicate with host/job site to arrange opportunity.

2. Complete job/internship search documents and activities.

Assessment Strategies

2.1. Written Products
2.2. Practice interview
2.3. Job/internship search activities

Criteria

You will know you are successful when:

2.1. you investigate (real or simulated) HTM/biomed internships or positions at approved host-sites
2.2. you produce professional employment written products such as a biography, resume, and various employment letters
2.3. you apply (real or simulated) for HTM/biomed internships or positions at approved host-sites
2.4. you participate in practice or real job type interviews

Learning Objectives

2.a. Adhere to clinical site requirements prior to start of course.
2.b. Investigate internship/job opportunities that are available.
2.c. Perform a job/internship search.
2.d. Produce a biography.
2.e. Write a resume.
2.f. Write employment type letters.
2.g. Complete employment type interview(s).

3. Adhere to safety requirements within the clinical/job site.

Assessment Strategies

3.1. Written Products
3.2. Written Objective Test
3.3. On-the-job Performance

Criteria

You will know you are successful when

3.1. you utilize personal protective equipment as needed
3.2. you follow site safety procedures
3.3. you clean equipment worked on to clinical health standards both before and after the work as required
3.4. you perform maintenance activities adhering to typical safety requirements related to working within a clinical environment with electromechanical equipment
3.5. you arrange equipment worked on with safety in mind
3.6. you adhere to hazardous waste, disposal, and recycling protocols
3.7. your work performance is successfully evaluated by staff or instructor

Learning Objectives

3.a. Locate service information necessary to perform equipment maintenance activities in a safe manner.
3.b. Locate required equipment to perform work in a safe manner.
3.c. Clean equipment you work on before and after the work as required.
3.d. Arrange the equipment and its accessories in a safe and organized professional fashion.
3.e. Look up SDSs for the materials you work with and follow their guidance.
3.f. Follow site recycling and disposal protocols.

4. Demonstrate job skills necessary to be a successful biomedical equipment technician.

Assessment Strategies

4.1. On-the-job Performance
4.2. Written Objective Test
4.3. Written Products

Criteria

You will know you are successful when:

4.1. you explain the job skills necessary to be a successful HTM/BMET (Healthcare Technology

Management/BioMedical Equipment Technician)
4.2. you communicate with peers and supervisor in an effective manner
4.3. you perform as a collaborative team member
4.4. you document activities in a written submission to accepted standards
4.5. you select the correct supplemental equipment to perform your work
4.6. you perform all critical steps in the right order for safety testing, performance testing, and troubleshooting
4.7. your work performance is successfully evaluated by staff or instructor
4.8. you demonstrate sound reasoning as you describe the decisions you make throughout your work process as you perform it
4.9. you maintain an organized work space

Learning Objectives

4.a. Locate service information necessary to perform inspection/repair of equipment.
4.b. Examine equipment to determine fault or function within a group or independently.
4.c. Determine the correct supplemental equipment that an HTM/BMET needs for repair or testing equipment.
4.d. Apply critical thinking for successful completion of a service request.
4.e. Work within a group.
4.f. Clean equipment you work on before and after the work as required.
4.g. Arrange the equipment and its accessories in an organized and professional fashion.
4.h. Document all work activities immediately after that work session as required by industry standards.

5. Perform PMs (planned/preventative maintenance) on an approved list of medical devices.

Assessment Strategies

5.1. Written Products
5.2. Written Objective Test
5.3. On-the-job Performance

Criteria

You will know you are successful when

5.1. you describe the clinical application and function for the list of medical devices (Aspirator, SCD, Infusion devices, Defibrillators, Hyfrecator/ESU, and/or other approved devices)
5.2. you describe the basic theory of operation for the list of medical devices
5.3. you perform inspections on the list of medical devices to industry standards
5.4. you use appropriate operators and service manuals and documentation or training to perform PM/repair activities
5.5. you use the correct test equipment and tools or accessories for the PM/repair activity
5.6. you perform or identify the need for calibration/troubleshooting/repair on inspected medical devices
5.7. you prioritize work in industry approved manner (FIFO, emergent/normal priority, opportunistic, and other)

Learning Objectives

5.a. Complete worksheets or research on approved list of medical devices.
5.b. Participate in training at host site or simulated environment.
5.c. Perform PM/repair activities on approved list of medical devices.
5.d. Research required information as needed.

6. Operate required supplemental equipment to perform PM/repair, such as test equipment, tools, manuals, software, phantoms, simulators, accessories, and supplies.

Assessment Strategies

6.1. Written Products
6.2. On-the-job Performance

Criteria

You will know you are successful when

6.1. you explain the role of the supplemental equipment to PM/repair including test equipment, tools, manuals, software, phantoms, simulators, accessories, and supplies
6.2. you select the correct supplemental equipment to perform your work
6.3. you obtain the operator’s manuals or supervised training for the supplemental equipment

6.4. you perform all critical steps in the right order for setting up the supplemental equipment to perform your work
6.5. you demonstratesound reasoning as you describe the decisions you make
6.6. you wear personal protective equipment as needed and follow safety procedures
6.7. you demonstrate an understanding of the purpose of the supplemental equipment as it applies to the equipment under test
6.8. you demonstrate an understanding of the function of the supplemental equipment as it applies to the equipment under test
6.9. you take into account the limits of the supplemental equipment accuracy
6.10. you understand supplemental equipment calibration requirements
6.11. your work performance is successfully evaluated by staff/instructor.

Learning Objectives

6.a. Identify the function/purpose of various types of biomedical supplemental/test equipment.
6.b. Select the correct type of supplemental equipment for the task at hand.
6.c. Operate various types of supplemental/test equipment.
6.d. Work on equipment within a group supervised by instructor/clinical staff.

7. Document on-site clinical activities.

Assessment Strategies

7.1. Written Products
7.2. On-the-job Performance

Criteria

You will know you are successful when:

7.1. you prepare informational products using accepted industry standards for written products including format, grammar, punctuation, and spelling
7.2. you submit informational products before working on equipment in question
7.3. you document your work on equipment immediately after performing that work
7.4. you document your work performed to industry standards within actual or simulated maintenance database software such as a CMMS (computerized medical maintenance software)

Learning Objectives

7.a. Complete informational products such as worksheets, or other, before working equipment in question.
7.b. Demonstrate the skills necessary to log equipment work activities into a computerized tracking database.
7.c. Perform documentation immediately after performing work.

8. Investigate or tour various types of clinical environments to explain the medical equipment systems and related maintenance requirements.

Assessment Strategies

8.1. Real or simulated clinical site tours.
8.2. Written Products

Criteria

You will know you are successful when

8.1. you explain in-house HTM/BMET maintenance and repair of medical equipment and systems
8.2. you explain the role of HTM/BMET in facilitating OEM or third-party maintenance and repair of medical equipment and systems
8.3. you explain the inter-relationships and duties of HTM/BMET with Facilities Operations and IT within an organization for the maintenance and repair of medical equipment and systems
8.4. you explain the role of HTM/BMET in providing customer applications support for medical equipment systems
8.5. you identify the equipment and support requirements within a variety of clinical sites such as the laboratory, intensive care, general medical, surgery, central processing, imaging, clinic sites, and etc.

Learning Objectives

8.a. Tour (real or simulated) a variety of clinical sites.
8.b. Identify the medical equipment and systems within a variety of clinical sites.
8.c. Explain the appropriate type of support for the identified medical equipment and systems.