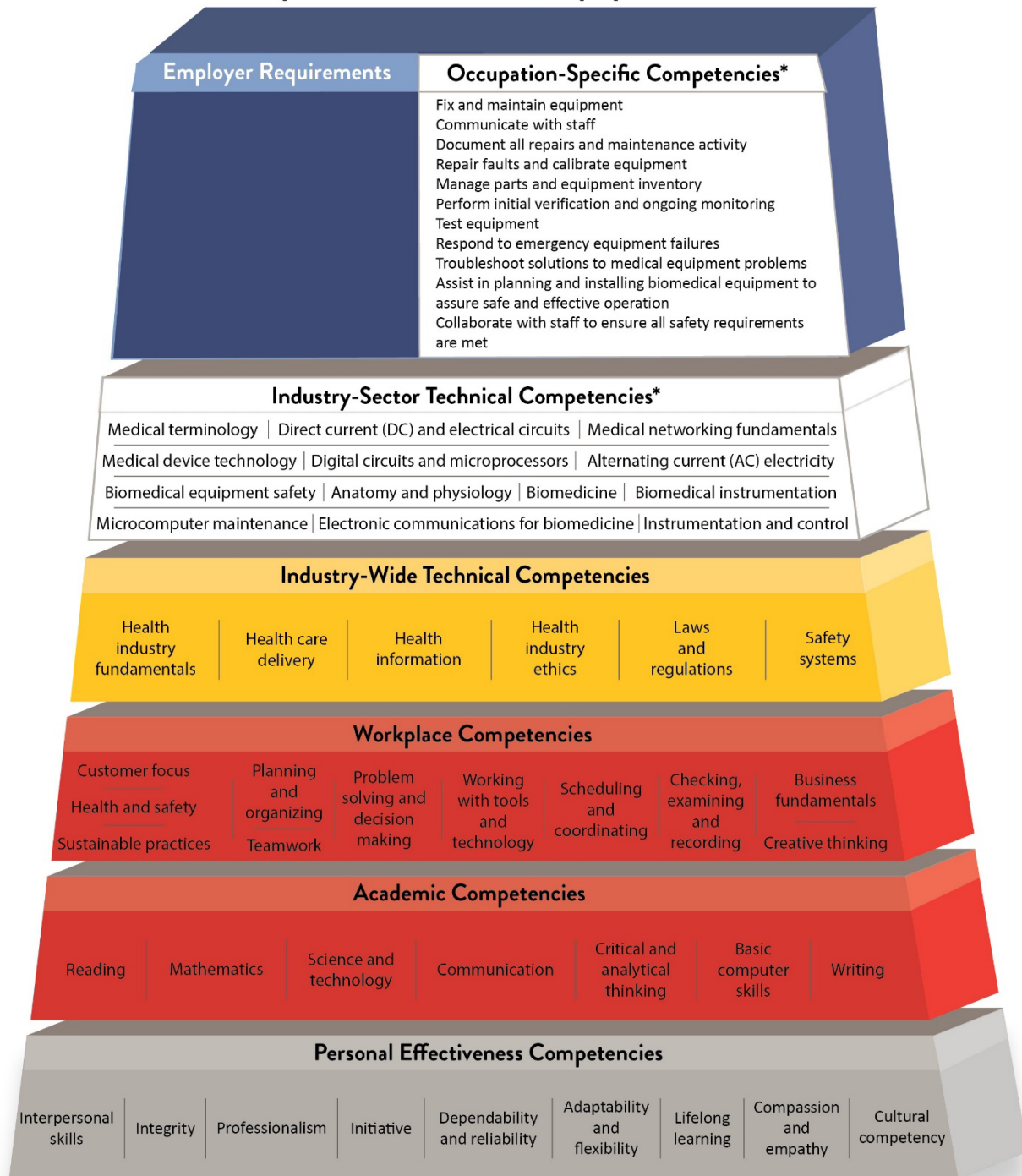


# Minnesota Dual-Training Pipeline Competency Model for Health Care Services Occupation: Biomedical Equipment Technician



Based on: Fundamentals of Health Care Competency Model, Employment and Training Administration, United States Department of Labor, September 2018.

\* Pipeline recommends the Industry-Sector Technical Competencies as formal training opportunities (provided through related instruction) and the Occupation-Specific Competencies as on-the-job training opportunities.



## Competency Model for Biomedical Equipment Technician

**Biomedical Equipment Technician** – An individual who works in a health care facility and is trained to install and maintain patient monitors, ventilators, ultrasound equipment, X-ray machines and other patient care equipment. Often, biomedical technicians specialize in certain types of medical equipment based on where and how it is used—doctor offices, hospitals, surgery suites, dental and radiology, etc.

### Industry-Sector Technical Competencies

**Related Instruction** for dual training means the organized and systematic form of education resulting in the enhancement of skills and competencies related to the dual trainee’s current or intended occupation.

- **Biomedicine** – Understand that biomedicine is a branch of medical science that applies biological and physiological principles to clinical practice to promote health and healing.
- **Direct current (DC) and electrical circuits** – Understand direct current (DC) with electrical circuits and that an electrical circuit is an interconnection of electrical elements on meter measurements, current flow, and voltage division.
- **Medical terminology** – Knowledge and understanding of medical terms.
- **Alternating current (AC) electricity** – Understand alternating current (AC) waveforms, oscilloscope operation, meter measurements, and AC vs. DC comparisons.
- **Anatomy and physiology** – Understand basics of the structure and relationship of body parts and the function of body parts and the body as a whole.
- **Biomedical equipment safety** – Understand the measures taken to ensure the safe and accurate operation of medical equipment that is used in patient care.

- **Microcomputer maintenance** – Able to maintain equipment to ensure its proper functioning.
- **Instrumentation and control** – Understand that instrumentation and control are branches of engineering that deal with the measurement and control of process variables within a production or manufacturing area.
- **Electronic communications for biomedicine** – Understand the principles of amplitude modulation, frequency modulation, and multiplexing fundamentals.
- **Digital circuits and microprocessors** – Understand how a digital circuit is used in electronic equipment and how it interacts with microprocessors in the equipment.
- **Medical networking fundamentals** – Understand medical network implementations, medical network operations, medical network security, and medical network troubleshooting.
- **Medical device technology** – Understand the study of medical equipment design and components.
- **Biomedical instrumentation** – Understand advanced technologies used in the medical field, including various test equipment, perform preventative maintenance and use of testing equipment for maintaining proper operation.

## **Occupation-Specific Competencies**

**On-the-Job Training (OJT)** is hands-on instruction completed at work to learn the core competencies necessary to succeed in an occupation. Common types of OJT include job shadowing, mentorship, cohort-based training, assignment-based project evaluation and discussion-based training.

- **Fix and maintain equipment** – Understand how to properly repair and maintain specific medical machinery to ensure patient safety.
- **Communicate with staff** – Able to communicate timely and accurately with staff on tasks, equipment status, alternatives for emergencies.
- **Document all repairs and maintenance activity** – Able to document everything from installation to diagnosing equipment malfunctions to ongoing maintenance.

- **Assist in planning and installing biomedical equipment to assure safe and effective operation**  
– Understand how to receive, inspect, and inventory equipment upon delivery and how to install for successful use.
- **Repair faults and calibrate equipment** – Able to follow procedures and use appropriate tools to facilitate repair and perform calibration to manufacturer specifications.
- **Collaborate with staff to ensure all safety requirements are met** – Understand the need to wear personal protective equipment appropriate for the installation/maintenance activity and work with clinical staff to ensure restricted access to areas as necessary.
- **Manage parts and equipment inventory** – Understand how to include receiving and delivering, inventory counts, transporting goods as needed and assist clinical management with costs. Also includes knowing how to purchase and retain an inventory of parts.
- **Perform initial verification and ongoing monitoring** – Able to track medical equipment assuring documentation complies with manufacturer's specifications.
- **Test equipment** – Understand how to perform tests of the equipment to ensure it is good working order as well as after completion of a repair to ensure that it is sufficiently fixed and ready to be used for patient care.
- **Respond to emergency equipment failures** – Understand how to complete urgent repairs within 24 hours based on part availability while ensuring public and employee safety.
- **Troubleshoot solutions to medical equipment problems** – Know how to think quickly and develop ideas and solutions to fix and repair medical equipment when problems arise.

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