

Medical Education and Training Campus (METC)

Biomedical Equipment Technician (BMET)

Air Force	Biomedical Equipment Technician (USAF)	L8ABJ4A231 00AA
Army	Biomedical Equipment Specialist (USA)	326-68A10
Navy	Biomedical Equipment Technician (USN)	B-326-1000

Curriculum Plan



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Change Record

Item to Change	Description	Date Approved
AF Course # (Cover Sheet)	AF Course number changed from: J3ABR4A231 00AA to L8ABJ4A231 00AA.	17 July 2013
112A Contact Hours (Pgs: 29, 31, 82)	Total hours changed to reflect 208 contact hours. Modified comment: Deviation from the Standard 8-hour training day: 24 hour FTX continuous operation training during four (4) days (totaling 96 training hours). The reflected total contact hours includes the 96 hour FTX during the 18 days of training. Actual contact hours total 208"	10 April 2014
ARMY Course # (Cover Sheet)	Army Course number changed from: 4B-F2/198-68A10 to 326-68A10	30 Mar 2017
(Cover Sheet) (PGs: 2-4, 8-9, 27-28, 32-37)	Change 4 BMET 101 & 102 changed CBI/Trainer to Labvolt	
C5; Cover page	Corrected typo: AF start date typo error as 5 Jan, corrected to 8 Jan	21 Dec 2017

Section 1: General Program Information

Program Description:

The vision is to be recognized as the world renowned "Center of Excellence" for biomedical equipment technician training. The instructional design for this program is group lock-step. This program provides initial skills training for biomedical equipment technician personnel to include clinical applications, operation, inspection, maintenance, and modification of a wide variety of biomedical equipment systems used in fixed and mobile medical and dental treatment facilities of the Army, Navy, and Air Force. The program consists of a combination of teaching methods: lecture (didactic), demonstration, interactive courseware, and performance. BMET Courses 101 and 102 contain basic electronic principles necessary to complete the remainder of the program. BMET Courses 103 through 111 contain in-depth medical equipment maintenance and troubleshooting. BMET Course 112F contains Service specific training for the Air Force. BMET Course 112A contains Service specific training for the Army. BMET Course 112N contains Service specific training for the Navy.

Navy students attend five (5) additional courses contained within five (5) independent METC programs to obtain the 8410 Navy Enlisted Classification (NEC) as part of the Biomedical Equipment Technician Training Program (B-326-1000). Program descriptions, task correlations, instructional methods and reference/equipment lists are disclosed in the respective curriculum documentation:

Computer Based Medical Systems (CBMS) Program – CBMS 101
Telemedicine (TELE) Program – TELE 101
Radiographic/Fluoroscopic Imaging Systems (RFIS) Program – RFIS 101
Mammography Imaging Systems (MIS) Program – MIS 101
Ultrasound Imaging Systems (UIS) Program – UIS 101

Enrollment Data:

Minimum Enroll: 6
Maximum Enroll: 20
Programmed: 16
Entry Interval: 11

Program Goal(s):

The program goal/mission is to train, mentor, professionally develop, and qualify the finest technically proficient apprentice-level Army, Navy, and Air Force biomedical equipment technicians. Graduates will demonstrate:

- Knowledge of clinical applications, related physiology, and theory of operations.
- Knowledge and skills of calibration and system repair.
- The ability to comprehend, relate, and evaluate information relevant to the role of the biomedical equipment technician in circuit analysis, troubleshooting, calibration, and safe operating procedures.
- Technical proficiency and skills required to fulfill the role of a biomedical equipment technician.
- Social and interpersonal skills consistent with professional expectations required to perform as subject-matter experts.

PDS Code:

U10

Instructional Design:

Group Lockstep

Security Classification:

UNCLASS

Accreditation Statement(s):

This program will be submitted to the American Council on Education for evaluation of credit hours. This is a Community College of the Air Force credit awarding program. Additional accreditation information can be located by accessing the following internet sites:

Council on Occupational Education (COE)
<http://www.council.org/>

Community College of the Air Force
<https://ccaf.maxwell.af.mil/>

American Council on Education
<http://www.acenet.edu/>

Faculty Qualifications:

The Program Director will be an officer position rotating among the three services every three years. In the event one service cannot support or provide for this position, the next service in line will support the requirement. This position will be from the clinical engineering, or equivalent career field; i.e. Navy MSC with 1804 sub-specialty code. The Army requires the individual to have completed a military BMET training program.

Instructors must have completed the METC instructor training course or an equivalent Service instructor course. Instructors also must have completed a teaching internship and have all appropriate subject-matter qualifications. Instructors must possess at least an associate degree or be within twelve months of completion of all degree requirements upon arrival to METC. See the METC Faculty Development Policy and Community College of the Air Force (CCAF) faculty requirements for additional information regarding faculty qualifications.

Student Prerequisites:

Army Specific:

Refer to the current DA Pam 611-21 and MOS Prerequisites at:
<http://appd.amedd.army.mil/enlisteddivision.aspx>

<https://www.atrrs.army.mil/atrrscc/prerequisites.aspx?fy=2011&sch=083&crs=4B-F2/198-68A10&phase=&clsflag=>

Air Force Specific:

Refer to the current Air Force Enlisted Classification Directory (AFECD) at:
<https://gum.afpc.randolph.af.mil/>

In the search box, enter “Enlisted Classification” to access most recent directly.

Note: The AFECD is published/updated quarterly and is effective on 31 January, 30 April, 1 August, and 31 October (unless stated otherwise in the directory). The web page listed above provides the current and the projected AFECD.

Air Force specific: See AFI 36-2101, Classifying Military Personnel (Officer and Enlisted)
<http://www.e-publishing.af.mil/shared/media/epubs/AFI36-2101.pdf>

Navy Specific:

See Catalog of Navy Training Courses (CANTRAC)
<https://cetarsj2eepd.cnet.navy.mil/cantrac/vol2.html>

Program Synopsis by Course:

This program consists of multiple courses. All courses must be completed successfully in the order listed to pass this program.

Consolidated Courses

BMET 101 Electronic Principles I

Course Description: Students are provided with an introductory overview of program curriculum, policies, and guidelines to follow while in training. Computer-based training is employed and combined with lecture. Instruction is conducted in the following areas:

Introduction to Electricity - Basic Direct Current (DC) Theory

Identify basic principles of Ohm's Law, Voltage, Current, Resistors, Switches, Batteries and Multimeters

DC Circuits

Identify basic principles of Series Circuits, Parallel Circuits, Series/Parallel Circuits, and Complex DC Circuits

Fundamentals of AC Theory and Test Equipment

Identify basic principles of Basic AC Theory and Test Equipment Use, Function Generator and Oscilloscope Use (Produce Specified Waveforms, Measure Voltage and Frequency, and Analyze Waveforms), and RC and RL Circuits and RC Time Constants

Fundamentals of AC Theory and Test Equipment

Identify basic principles of RC and RL Time Constants, Capacitive/Inductive & LCR Circuits, and Series and Parallel Resonance Circuits

Transformers, Diodes, and Switching Devices

Identify basic principles of Transformers, Diode Junctions, Diode Limiters, and Relays to include Switches and Solenoids

Course Goals: Student will be able to accomplish the following upon completion of the course:

Analyze the fundamentals and functions of: Alternating Current (AC) and Direct Current (DC) circuits and various AC/DC electronic components used in medical equipment relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of Multimeters, Oscilloscopes, and Function Generators.

BMET 102 Electronic Principles II

Course Description: Electronic Principles II further enhances the skills learned in Course 101. Computer-based electronics training is continued throughout this course. Students are exposed to some of the more complex circuits that they will see throughout the program.

Instruction is conducted in the following six areas:

Transistors

Identify basic principles: Common Emitter, Base, and Collector Amplifiers,
Power Supplies and Amplifiers

Identify basic principles: Rectifiers, Voltage Regulators, Zener Diodes, Multistage
Transistors, RC Coupled Transistors, Push-Pull Amplifiers, Field Effect Transistors, and
MOSFETs

Transistor Oscillator and Pulse Circuits

Identify basic principles: Hartley, Colpitts, RC Phase Shift, Sawtooth, Coupling Oscillators,
Multivibrators, and Schmitt Triggers

Solid State Triggers and Amplifiers

Identify basic principles: SCR, DIAC, TRIAC, UJT, and PUT's

Basic Digital Circuits

Identify basic principles: Gates, Combination Circuits, 555 Timers, D-Type Flip flops,
J-K Flip Flops, Shift Registers, Counters, Digital to Analog Converters, and Data Circuits.

Microprocessors, and Motors

Identify General Principles of Microprocessor Performance Characteristics and Motors

Course Goals: Student will be able to accomplish the following upon completion of the course:

Analyze the fundamentals and functions of solid state and integrated circuit devices, digital techniques, performance techniques of microprocessors, and motors used in medical equipment relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of circuit recognition and purpose.

Course Prerequisite(s): BMET 101 Electronic Principles I.

BMET 103 Troubleshooting Principles

Course Description: Introduction to Troubleshooting is divided into lecture/discussion phase and performance based, hands-on troubleshooting phase.

Lecture/Discussion Phase - The lecture portion encompasses the following areas that are presented in a lecture/discussion type format:

Safety

Identify principles of safety precautions and general safety

Medical Terminology

Identify basic facts of Medical Terminology

Medical Professional Factors

Identify basic facts of Professional Relations, Standards of Ethics, Standards of Conduct, and Primary Care Optimization

Clinical Applications

Identify basic facts of Clinical Applications for Suction/Pressure Units and Ultrasonic Therapy Units

General Troubleshooting

Identify principles of General Troubleshooting

Performance Based Phase - Students will familiarize themselves individually with each unit and progress through at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Soldering

Demonstrate Proper Soldering Techniques

Hospital Grade Plugs

Use appropriate tools to wire the plug

Suction/Pressure Unit

Perform Preventive Maintenance Inspection, Perform Calibration Inspection and Isolate Inserted Malfunctions

Ultrasonic Therapy Unit

Perform Preventive Maintenance Inspection, Perform Calibration Inspection and Isolate Inserted Malfunctions

Course Goals: Student should be able to accomplish the following upon completion of the course:

Comprehend medical terminology, understand fundamentals of professional and patient relations to include standards of ethics, conduct, and primary care optimization relevant to the role of the biomedical equipment technician.

Analyze the clinical applications, the principles of general troubleshooting, and demonstrate proper soldering techniques used in medical equipment relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of Test, Measurement and Diagnostic Equipment (TMDE) in performing preventive maintenance inspections, calibrations and isolation of malfunctions on an ultrasonic therapy unit and a suction/pressure unit.

Course Prerequisite(s): BMET 102 Electronic Principles II.

BMET 104 Introduction to Medical Equipment

Course Description: Introduction to Medical Equipment is divided into lecture/discussion phase and performance based, hands-on troubleshooting phase.

Lecture/Discussion Phase - The lecture portion encompasses the following areas that are presented in a lecture/discussion type format:

Acoustics

Identify basic principles of Acoustics and Associated Acoustic Noise Hazards

Anatomy and Physiology (A & P)

Identify principles of A & P as it relates to General Medical Equipment

Clinical Applications

Identify basic facts relating to using Audiometers, Hypo/Hyperthermia Systems, Infant

Transport Incubators, and Infusion Pumps

Maintenance

Identify basic facts of the Preventive Maintenance of Audiometers, and Calibration of infant Transport Incubators

Performance Based Phase - Students will familiarize themselves individually with each unit and progress through at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Hypo/Hyperthermia Unit

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Infant Transport Incubator

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Infusion Pump

Perform Preventive Maintenance Inspections, Calibrations and Isolate Inserted Malfunctions

Course Goals: Student will be able to accomplish the following upon completion of the course:

Analyze the principles of acoustics and associated acoustic noise hazards, principles of A & P as it relates to General Medical Equipment, clinical applications of Audiometers, Hypo/Hyperthermia Systems, Infant Transport Incubators, and Infusion Pumps relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on Audiometers, Hypo/Hyperthermia Unit, Infant Transport Incubator and an Infusion Pump and Calibrate an Infant Transport Incubator.

Course Prerequisite(s): BMET 103 Troubleshooting Principles.

BMET 105 Physiological Monitoring Equipment

Course Description: Physiological Monitoring Equipment is divided into lecture/discussion phase and performance based, hands-on troubleshooting phase.

Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Safety

Identify principles pertaining to Protective Devices, Surge Protectors, Wire Sizing and Electrical Shock Hazards

Electrodes and Transducers

Identify principles of Electrodes and Transducers related to Patient Care

Anatomy and Physiology (A & P)

Identify A & P principles pertaining to Central Patient Monitoring Systems

Clinical Applications

Identify basic facts about Telemetry Systems, Electrocardiographs (ECG), Defibrillators, Diagnostic Ultrasound Doppler Units, Fetal Heart Monitors, Pulse Oximeters, and Invasive/Non-Invasive Blood Pressure Monitors

Maintenance

Identify procedures pertaining to Calibration of Fetal Heart Monitors

Performance Based Phase - Students will familiarize themselves individually with each unit and progress at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Electrocardiograph Unit

Perform Electrical Safety Inspection and Calibration Verification

Defibrillator

Perform Preventive Maintenance Inspections, Calibration Verification and Isolate Inserted Malfunctions

Fetal Heart Monitor

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Noninvasive Blood Pressure Monitor

Perform Preventive Maintenance Inspection and Isolate Inserted Malfunctions.

Course Goals: Students will be able to accomplish the following upon completion of the course
Analyze safety principles pertaining to Protective Devices, Surge Protectors, Wire Sizing, Electrical Shock Hazards, principles and function of Electrodes and Transducers related to Patient Care, and A & P principles pertaining to Central Patient Monitoring Systems relevant to the role of the biomedical equipment technician.

Have knowledge of clinical applications, related physiology and theory of operations about Telemetry Systems, Electrocardiographs (ECG), Defibrillators, Diagnostic Ultrasound Doppler Units, Fetal Heart Monitors, Pulse Oximeters, and Invasive/Non-Invasive Blood Pressure Monitors.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on Electrocardiograph Units, Defibrillators, Fetal Heart Monitors, and Noninvasive Blood Pressure Monitors.

Course Prerequisite(s): BMET 104 Introduction to Medical Equipment.

BMET 106 Medical Support Equipment

Course Description: Medical Support Equipment is divided into lecture/discussion phase and performance based, hands-on troubleshooting phase. The instructional design for this course is group lockstep. The course consists of a combination of teaching methods: lecture (didactic), demonstration, interactive courseware, performance, and in-depth medical equipment troubleshooting. The instructional sequence may vary from lesson plan sequence because of equipment and space limitations.

Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Hospital Safety Practices

Identify basic facts pertaining to Biological, Chemical, and Fire Hazards

Plumbing

Identify principles relating to Plumbing pertaining the Facility and Equipment Interface

Anatomy and Physiology (A & P)

Identify principles of A & P as it relates to Laboratory Systems

Clinical Applications

Identify basic facts of Fume and Laminar Flow Hoods, Chemistry Analyzers, Electrolyte Analyzers, Electronic Particle Counters, Blood/Fluid Warmers, Blood Gas Analyzers, Blood Cell Washing Systems and Centrifuges

Maintenance

Identify basic facts of Preventive Maintenance Inspections for Chemistry Analyzers, identify facts for Locating Biomedical Equipment Part Numbers, and determining procedures for Assigning Condition Codes

Performance Based Phase - Students will familiarize themselves individually with each unit and progress at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Blood Gas Analyzer

Perform Preventive Maintenance Inspection, Perform Calibration Verification

Blood/Fluid Warmers

Perform Preventive Maintenance Inspection and Isolate Inserted Malfunctions

Chemistry Analyzers

Isolate Inserted Malfunctions

Centrifuge

Perform Preventive Maintenance Inspection, Perform Calibration Verification and Isolate Inserted Malfunctions

Dental Compressor System

Perform Preventive Maintenance Inspection

Open, Document, and Close a Maintenance Workorder using an Automated Workorder system

Perform Historical Maintenance and Equipment Data File Maintenance Actions

Perform Maintenance using Power and Hand Tools

Demonstrate proper Plumbing connections of the following: Steel, Copper, and Polyvinyl Chloride (PVC)

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze hospital safety practices pertaining to Biological, Chemical, and Fire Hazards, comprehend principles relating to Plumbing in Facility and Equipment Interface, and principles of A & P as it relates to Laboratory Systems relevant to the role of the biomedical equipment technician.

Have knowledge of clinical applications, related physiology, and theory of operations about medical laboratory systems.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on Blood/Fluid Warmers, Chemistry Analyzers, Centrifuges, Blood Gas Analyzers and Dental Compressors.

Open, Document, and Close a Maintenance Workorder using an Automated Workorder system, Perform Historical Maintenance and Equipment Data File Maintenance Actions and perform maintenance using power and hand tools relevant to the role of the biomedical equipment technician in a medical facility.

Course Prerequisite(s): BMET 105 Physiological Monitoring Equipment.

BMET 107 Dental and Sterilization Equipment

Course Description: Dental and sterilizer systems is divided into lecture/discussion phase and performance based, hands-on troubleshooting. The instructional design for this course is group lockstep. The course consists of a combination of teaching methods: lecture (didactic), demonstration, interactive courseware, performance, and in-depth medical equipment troubleshooting. The instructional sequence may vary from lesson plan sequence because of equipment and space limitations.

Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Safety and Facilities Issues

Identify Basic Principles relating to Vacuum Systems as they pertain to Facility and Equipment Interface

Physical Principles

Identify Mechanical Principles applicable to Biomedical Equipment Maintenance to include Associated Hazards, Principles of Refrigeration Systems, Steam Principles applicable to Biomedical Equipment Maintenance, and Hydraulic and Pneumatic Principles applicable to Biomedical Equipment Maintenance

Anatomy and Physiology (A & P)

Identify principles about A & P as they relate to Dental Treatment Systems

Clinical Applications

Identify Basic Facts of Ultrasonic Cleaners, Flexible and Rigid Fiber Optic Scope Systems and Fiber Optic Scope Washers, Dental Operating Systems and Ultrasonic Prophylaxis Units, and Steam and Plasma Sterilizers.

Maintenance

Identify facts pertaining to Preventive Maintenance of Ultrasonic Cleaners and Identify facts pertaining to Installation of a Dental Operating System

Performance Based Phase - Students will familiarize themselves individually with each unit and progress at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Dental Operating System

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Dental Ultrasonic Prophylaxis

Perform Operational Inspections and Isolate Inserted Malfunctions

Steam Sterilizer

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze and comprehend safety and facility issues, physical principles, anatomy and physiology, clinical applications and maintenance of dental and sterilization systems relevant to the role of the biomedical equipment technician in a medical facility.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on Dental Operatory Systems, Dental Prophylaxis and Steam Sterilization Systems.

Course Prerequisite(s): BMET 107 Dental and Sterilization Equipment.

BMET 108 Surgical Equipment

Course Description: Surgical Equipment is divided into lecture/discussion phase and performance based, hands-on troubleshooting phase.

Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Safety and Facilities Issues

Identify principles of Isolated Power, Emergency Power, and Grounding Systems as they pertain to Facility and Equipment Interface

Identify principles of Central Gas Systems as they pertain to Facility and Equipment Interface

Identify principles pertaining to hazards associated with Flammable, Compressed and Occupationally Hazardous Gases

Identify principles pertaining to Hazards Associated with Inhalation Anesthetizing Locations

Anatomy and Physiology (A & P)

Identify principles of A & P as it relates to Respiratory Systems

Clinical Applications

Identify basic facts of Respiration Monitors, Pulmonary Function Analyzers, Volume/Pressure and High Frequency Ventilators, Electrosurgical Unit & Anesthesia Unit

Maintenance

Identify basic facts of Calibration of Volume/Pressure Ventilators

Performance Based Phase - Students will familiarize themselves individually with each unit and progress through at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Pulmonary Function Analyzers

Perform Preventive Maintenance Inspections, Calibration Verification, and Isolate Inserted Malfunctions

Volume/Pressure Ventilators

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Anesthesia Unit

Perform Preventive Maintenance Inspections, Calibration Verification and Isolate Inserted Malfunctions

Electrosurgical Unit

Perform Preventive Maintenance Inspections, Calibration Verification and Isolate Inserted Malfunctions

Course Goals: Students will be able to accomplish the following upon completion of the course:
Analyze and comprehend safety and facility issues, anatomy and physiology, clinical applications and maintenance of surgical equipment relevant to the role of the biomedical equipment technician in a medical facility.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on Adult Volume/Pressure Ventilators, Anesthesia Systems, Pulmonary Function Analyzers, and Electrosurgical Units.

Course Prerequisite(s): BMET 107 Dental and Sterilization Equipment.

BMET 109 Diagnostic Imaging I

Course Description: Diagnostic Imaging I is divided into lecture/discussion phase and performance based, hands-on troubleshooting phase.

Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Safety and Facilities Issues

Identify principles of Battery Hazards, Single Phase Transformers and Three-Phase Transformers

Radiation and X-Ray Generation

Identify principles of Radiation Principles to include Associated Hazards and X-Ray Generation

Anatomy and Physiology (A & P)

Identify principles of A & P as it relates to Diagnostic Imaging Systems

Clinical Applications

Identify basic facts of Dental Intraoral and Panoramic X-Ray Systems, Fixed and Mobile Radiological and Fluoroscopic X-Ray Systems, Picture Archiving Communication Systems (PACS), Film Processors, and Automixers

Maintenance

Identify basic facts of Calibration for Dental Panoramic X-Ray Systems

Performance Based Phase - Students will familiarize themselves individually with each unit and progress through at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Film Processor

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Dental Panoramic X-Ray System

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Mobile X-Ray System

Perform Preventive Maintenance Inspections, Calibration Verification, and Isolate Inserted Malfunctions

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze and comprehend safety and facility issues, radiation and X-ray generation, anatomy and physiology, clinical applications and maintenance of diagnostic imaging equipment relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on Mobile Radiological Systems, Dental Panoramic Systems and Wet Film Processors.

Course Prerequisite(s): BMET 108 Surgical Equipment.

BMET 110 Diagnostic Imaging II

Course Description: Diagnostic Imaging II is divided into lecture/discussion phase and performance based, hands-on troubleshooting phase:

Lecture/Discussion Phase The lecture portion encompasses the following areas:

Safety

Identify basic facts of Hospital Safety Practices pertaining to Laser Hazards

Ultrasound, Laser, and Optical Principles

Identify principles of Laser, Ultrasound and Optical principles

Clinical Applications

Identify basic facts pertaining to Computed Tomography (CT), Digital Radiography (DR) and Computed Radiography Plate Readers (CR), Mammography, Laser Imagers, Medical Laser Systems, Diagnostic Ultrasound Imaging Systems, Nuclear Medicine, and Magnetic Resonance Imaging (MRI)

Maintenance

Identify procedures pertaining to Preventive Maintenance Inspections of Fixed Radiological X-Ray Systems, and Calibration of Diagnostic Ultrasound Imaging Systems

Performance Based Phase - Students will familiarize themselves individually with each unit and progress through at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Diagnostic Ultrasound Units

Perform Preventive Maintenance Inspections on Diagnostic Ultrasound Units

Computed Radiography Plate Readers

Perform Preventive Maintenance Inspections on Computed Radiography Plate Readers

Mobile Fluoroscopic X-Ray Systems

Perform Preventive Maintenance Inspections and Calibration Verification

Fixed Radiological X-Ray Systems

Isolate Inserted Malfunctions on Fixed Radiological X-Ray Systems

Fixed Fluoroscopic X-Ray Systems

Isolate Inserted Malfunctions on Fixed Fluoroscopic X-Ray Systems

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze and comprehend safety, ultrasound, laser, and optical principles, clinical applications and maintenance of diagnostic imaging equipment relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of Test, Measurement and Diagnostic Equipment (TMDE) in performing preventive maintenance inspections, calibrations and isolation of malfunctions on Fixed Radiological/Fluoroscopic Systems, Computed Radiographic Plate Readers, Diagnostic Ultrasound Systems and Mobile Fluoroscopic Systems.

Course Prerequisite(s): BMET 109 Diagnostic Imaging I.

BMET 111 Information Technology and Field Equipment

Course Description: Information Technology and Field Equipment is divided into lecture/discussion phase and performance based, hands-on troubleshooting phase.

Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Safety

Identify basic facts pertaining to Safe Medical Devices Act (SMDA) to include accident and hazard reporting

Facilities Issues

Identify basic facts about Facilities Management Programs, Structural Requirements to include Architectural and Engineering Drawings, Environmental Control Systems, The Joint Commission Environment of Care Standards and Plans

Computer Principles

Identify general operating principles of Central Processing Units, Input/Output Devices

Identify principles about Computer Networks

Field Equipment Systems Applications

Identify System Application principles of Field Generators

Identify basic facts about applications of Field Power Distribution Systems, DOD

International Standards Organization (ISO) Expandable Shelter Systems, and

Environmental Control Units

Identify principles of systems applications of Oxygen Storage and Generation Systems

Maintenance

Identify facts pertaining to Installation and Site Preparation for DOD ISO Expandable Shelters

Identify facts pertaining to performing Organizational Maintenance on Power Production and Distribution System

Performance Based Phase - Students will familiarize themselves individually with each unit and progress through at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Information Systems Performance Lab

Isolate Inserted Malfunctions on a Computer System and Software

Field Generator

Perform Operational Inspections on a Field Generator

Power Distribution System

Perform Operational Inspections on a Power Distribution System

DOD ISO Expandable Shelter

Perform Operational Inspection and Organizational Maintenance on a DOD ISO Expandable Shelter

Environmental Control Unit

Perform Installation, Operational Inspections, and Organizational Maintenance on an Environmental Control Unit

Oxygen Storage and Generation System

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze and comprehend safety, facility issues, computer principles, field equipment systems applications and maintenance of Information Technology and Field Equipment relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on Information Technology Systems and Field Equipment.

Course Prerequisite(s): BMET 110 Diagnostic Imaging II.

Air Force Service Specific Courses:

BMET 112F Air Force Service Specific

Course Description: Air Force Service Specific course. The final segment of instruction for Air Force students prior to graduating the BMET training program. In this course, students are segregated by service affiliation for specific training requirements. These requirements are identified as critical by their service training proponent and not addressed within the core course curriculum. The Air Force Service Specific course is designed to train and evaluate Air Force students on medical equipment and maintenance management procedures in a hospital or field environment.

Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Air Force Medical Maintenance Management and Administration

- Identify basic facts relating to the Air Force Medical Service Mission, Organization and Function

- Identify basic facts relating to the Organizational Structure of the Biomedical Equipment Maintenance Program

- Identify basic facts relating to the Duties and Responsibilities of the AFMLO and MERC

- Identify basic facts relating to the Duties of the Biomedical Equipment Repairman

- Define Responsibilities of the Air Force Management of Government Property

- Identify principles of General Preventive Maintenance Techniques

- Determine procedures for Performing Initial Inspections

- Identify basic facts about Repair Part Inventory Requirements

Air Force Deployable Field Duties

- Identify basic facts about System Applications, Operational Inspections, Organizational Maintenance, and Installation of Lighting Systems

- Identify basic facts about System Applications, and Organizational Maintenance of Tactical Shelters

- Identify basic facts about System Applications for Field Communications Equipment

- Identify basic facts about Preparing Equipment for War Reserve Material Storage

- Identify basic facts about System Applications of Water Recovery Systems

Air Force Service Specific Field Duties

- Identify basic facts about Clinical Applications of Stress Test Systems

Performance Based Phase - Students will familiarize themselves individually with each unit and progress through at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Power Distribution System

- Perform Installation of a Power Distribution System

Power Production (Generator)

- Perform Installation of Power Production Systems

Tentage

- Perform Site Preparation, Install, and Prepare for Shipment of Tactical Shelters

Electrocardiograph Units

- Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Physiological/Vital Signs Monitoring Systems

- Perform Operational and Preventive Maintenance Inspections, and Calibration

Audiometers

Perform Operational and Preventive Maintenance Inspections, and Calibration

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze and comprehend Air Force medical maintenance management and administration, Air Force deployable field duties, and Air Force Service specific field duties relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on tentage and Air Force field/deployable medical equipment.

Course Prerequisite(s): BMET 111 Information Technology and Field Equipment.

R1 Expeditionary Medical Readiness Course (EMRC)

Course Description: This Air Force specific course provides practical and didactic training, with an orientation to continuing Medical Readiness Training (MRT) core topics, to include: active duty, AFRC, and ANG personnel attending 3-level medical/dental AFSC awarding courses. This course will provide training in emergency medical readiness and deployment skills training in a field hospital environment.

Course Goals: Students will gain emergency medical readiness and deployment skills in a field hospital's surgical suite, sterile processing, and supply areas.

Course Prerequisite(s): None

NOTE: BMET R1 course is taken by students at Camp Bullis prior to starting BMET 101. These 16 hours were not captured on the 2008 RRA, but are required training hours per AFI 41-106, Chapter 6 para 6.1.1. These 16 hours are not listed in the program length table of this CP.

Army Service Specific Courses

BMET 112A Army Service Specific

Course Description: Army Service Specific course. This is the final segment of instruction for Army students prior to graduating the BMET training program. In this course, students are segregated by Service affiliation for specific training requirements. These requirements are identified as critical by the Service training proponent and not addressed within the core course curriculum. The Army Service Specific course is designed to train and evaluate Army students on medical equipment and maintenance management procedures in a hospital and/or field environment.

Students are placed into a tactical environment, where they are evaluated on setting up and maintaining the maintenance section of a medical unit. The field training environment combines the technical, managerial, and tactical training they have received. Additional scenarios are added to increase the realism of the training that is provided. The primary goal is to prepare the soldiers to perform their duties at their gaining units with as little supervision as possible. The course is 18 days long and includes a 72 hour continuous operations mission long which the evaluation period takes place.

The following is a sample of what is required during the final segment of the course:

- Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE)
 - CBRNE Patient Decontamination in a Field Environment
- Field Equipment Performance Lab
 - Defibrillator
 - Perform a Technical Inspection (TI)
 - Vital Signs Monitoring System
 - Perform Preventive Maintenance Inspections, Calibration Verification, and Repair Faults
 - Fixed Dental X-Ray System
 - Perform Preventive Maintenance Inspections, Calibration Verification, and Repair Faults
 - Digital Dental Processor
 - Perform Preventive Maintenance Inspections, Calibration Verification, and Repair Faults
 - Medical Refrigeration System
 - Preventive Maintenance Inspection
 - Surgical Table
 - Perform Preventive Maintenance Inspections, and Repair Faults
 - Mobile X-Ray System
 - Perform Unpack, Set up, and Operational Inspections
 - Dental Operating System
 - Perform Unpack, Set up, and Operational Inspections

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze and comprehend Army medical equipment and maintenance management procedures relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on medical equipment in a hospital or field environment

Course Prerequisite(s): BMET 111 Information Technology and Field Equipment.

Navy Service Specific Courses

CBMS 101 Computer Based Medical System

Course Description: Navy Service Specific course. Attended by Navy students only. Refer to the CBMS course description located in the CBMS Curriculum Plan.

Note: See APPENDIX I for CBMS Curriculum Plan

TELE 101 Telemedicine

Course Description: Navy Service Specific course. Attended by Navy students only. Refer to the TELE course description located in the TELE Curriculum Plan.

Note: See APPENDIX J for TELE Curriculum Plan

RFIS 101 Radiographic/Fluoroscopic Imaging Systems

Course Description: Navy Service Specific course. Attended by Navy students only. Refer to the RFIS course description located in the RFIS Curriculum Plan.

Note: See APPENDIX K for RFIS Curriculum Plan

MIS 101 Mammography Imaging Systems

Course Description: Navy Service Specific course. Attended by Navy students only. Refer to the MIS course description located in the MIS Curriculum Plan.

Note: See APPENDIX L for MIS Curriculum Plan

UIS 101 Ultrasound Imaging Systems

Course Description: Navy Service Specific course. Attended by Navy students only. Refer to the UIS course description located in the UIS Curriculum Plan.

Note: See APPENDIX M for UIS Curriculum Plan

BMET 112N Navy Service Specific

Course Description: Navy Service Specific course. This is the final segment of instruction for Navy students prior to graduating the BMET training program. In this course, students are segregated by Service affiliation for specific training requirements. These requirements are identified as critical by the Service training proponent and not addressed within the core course curriculum. The Navy Service Specific course is designed to train and evaluate Navy students on medical equipment and maintenance management procedures in a hospital, field, or fleet environment.

The Navy Service Specific course covers familiarization on the following topics and equipment:

3M via the Shipboard Training Enhancement Program (STEP)
Navy Medical Maintenance Administration

Course Goals: Student will be able to accomplish the following upon completion of the course:

Analyze and comprehend the Navy 3M via the Shipboard Training Enhancement Program (STEP), and Navy Medical Maintenance Administration in a hospital, field, or fleet environment relevant to the role of the biomedical equipment technician

Have the technical proficiency and skills required to comprehend, relate, evaluate, and document results obtained through the use of TMDE in performing maintenance on medical equipment in a hospital, field, or fleet environment

Course Prerequisite(s): UIS 101 Ultrasound Imaging Systems.

Program Length Consolidated Courses

Course	Course Title	Did	CBI	Demo	Lab/ Prac	Clin	WTest	PTest	Other	Req'd Act.	Total
BMET 101	Electronic Principles I	29	95.5	1	2.5	0	4.5	1.5	2	0	136
BMET 102	Electronic Principles II	15	117.25	0	0	0	3.75	0	0	0	136
BMET 103	Troubleshooting Principles	62.5	0	0	72	0	1.5	0	0	0	136
BMET 104	Introduction to Medical Equipment	54.5	0	0	80	0	1.5	0	0	0	136
BMET 105	Physiological Monitoring Equipment	62.5	0	0	72	0	1.5	0	0	0	136
BMET 106	Medical Support Equipment	62.5	0	0	72	0	1.5	0	0	0	136
BMET 107	Dental and Sterilization Equipment	62.5	0	0	72	0	1.5	0	0	0	136
BMET 108	Surgical Equipment	54.5	0	0	80	0	1.5	0	0	0	136
BMET 109	Diagnostic Imaging I	70.5	0	0	64	0	1.5	0	0	0	136
BMET 110	Diagnostic Imaging II	62.5	0	0	72	0	1.5	0	0	0	136
BMET 111	Information Technology and Field Equipment	64.5	0	0	68.5	0	3	0	0	0	136
TOTAL		600.5	212.75	1	655	0	23.25	1.5	0	0	1496

Program Instructor-Student Ratios (Consolidated)

Course	Course Title	Did	Lab/ Prac	CBI	Clin	WTest	PTest	Other	Req'd Act.
BMET 101	Electronic Principles I	1:20 (29 hr)	3:20	3:20 (95.5 hr)		3:20	3:20	1:20	
BMET 102	Electronic Principles II	1:20 (15 hr)		3:20 (117.25hr)		3:20			
BMET 103	Troubleshooting Principles	1:20 (57.5 hr) 1:10 (5 hr)	3:20			1:20			
BMET 104	Introduction to Medical Equipment	1:20 (51 hr) 1:10 (3.5 hr)	3:20			1:20			
BMET 105	Physiological Monitoring Equipment	1:20 (56.5 hr) 1:10 (6 hr)	3:20			1:20			
BMET 106	Medical Support Equipment	1:20 (54.5 hr) 1:10 (8 hr)	3:20			1:20			
BMET 107	Dental and Sterilization Equipment	1:20 (59.5 hr) 1:10 (3 hr)	3:20			1:20			
BMET 108	Surgical Equipment	1:20 (50 hr) 1:10 (4.5 hr)	3:20			1:20			
BMET 109	Diagnostic Imaging I	1:20 (67 hr) 1:10 (3.5 hr)	3:20			1:20			
BMET 110	Diagnostic Imaging II	1:20 (60.5 hr) 1:10 (2 hr)	3:20			1:20			
BMET 111	Information Technology and Field Equipment	1:20 (49.5 hr) 1:10 (15 hr)	3:20			1:20			

Program Length Air Force-Specific Courses

Course	Course Title	Did	Lab/ Prac	WTest	PTest	Other	Req'd Act.	Total
BMET 112F	Air Force Service Specific	63	79.5	1.5	0	0	0	144
BMET R1*	Expeditionary Medical Readiness Course (EMRC)	7.5	8	0	0	0	0.5	16
TOTAL		70.5	87.5	1.5	0	0	0.5	160

*Note: BMET R1 course is taken by students at Camp Bullis prior to starting BMET 101. These 16 hours were not captured on the 2008 RRA, but are required training hours per AFI 41-106, Chapter 6 para 6.1.1. These 16 hours are not listed in the program length table of this CP.

Program Instructor-Student Ratios (Air Force Specific)

Course	Course Title	Did	Lab/ Prac	WTest	PTest	Other	Req'd Act.
BMET 112F	Air Force Service Specific	1:8	1:4 (78 hr) 1:8 (1.5 hr)	1:8			
BMET R1*	Expeditionary Medical Readiness Course (EMRC)	1:8	1:4				1:8

Program Length Army-Specific Courses

Course	Course Title	Did	Lab/ Prac	WTest	PTest	Other	Req'd Act.	Total
BMET 112A	Army Service Specific	68.5	121.5*	0	2	0	0	192*
	In-Processing						16	16
TOTAL		68.5	121.5*	0	2	0	16	208*

* Deviation from the standard 8-hour training day; 24 hour FTX continuous operation training during three (3) academic days (totaling 72 training hours). The reflected total contact hours includes the 72 hour FTX during the 18 days of training. Actual contact hours total 192;

Program Instructor-Student Ratios (Army Specific)

Course	Course Title	Did	Lab/ Prac	WTest	PTest	Other	Req'd Act.
BMET 112A	Army Service Specific	1:12 (62.5 hr) 1:6 (6 hr)	1:12 (43.5hr) 1:6 (4 hr) 1:4 (38 hr) 1:2 (36 hr)		1:12 (2 hr)		

Program Length Navy-Specific Courses

Course	Course Title	Did	Lab/ Prac	WTest	PTest	Other	Req'd Act.	Total
CBMS 101	Computer Based Medical Systems	69	89.5	1.5	0	0	0	160
TELE 101	Telemedicine	18.5	100	1.5	0	0	0	120
RFIS 101	Radiographic/Fluoroscopic Imaging Systems	27	91.5	1.5	0	0	0	120
MIS 101	Mammography Imaging Systems	25	37.5	1.5	0	0	0	64
UIS 101	Ultrasound Imaging Systems	17	37.5	1.5	0	0	0	56
BMET 112N	Navy Service Specific	119	23.5	1.5	0	0	0	144
TOTAL		275.5	379.5	9	0	0	0	664

Program Instructor-Student Ratios (Navy Specific)

Course	Course Title	Did	Lab/ Prac	WTest	PTest	Other	Req'd Act.
CBMS 101	Computer Based Medical Systems	1:10	1:5 (88 hr) 1:10 (1.5 hr)	1:10			
TELE 101	Telemedicine	1:5 (4.5 hr) 1:10 (14 hr)	1:5 (98.5 hr) 1:10 (1.5 hr)	1:10			
RFIS 101	Radiographic/Fluoroscopic Imaging Systems	1:10	1:5 (90 hr) 1:10 (1.5 hr)	1:10			
MIS 101	Mammography Imaging Systems	1:10	1:10	1:10			
UIS 101	Ultrasound Imaging Systems	1:10	1:10	1:10			
BMET 112N	Navy Service Specific	1:10	1:10	1:10			

Program Length Peacetime:

		METC Consolidated	Army	Navy	Air Force
Hours¹	Didactic	817.5	888	1093	888
	Lab/Practical	654.5	790*	1034	742
	Written Test ²	24	24	33	25.5
	Practical Test	0	2	0	0
	Other	0	0	0	0
	Subtotal Instructional	1496	1704*	2160	1655.5
	Required Activities	0	16	0	0.5
Total Instructional Hours		1496	1720*	2160	1656

* Deviation from the standard 8-hour training day; 24 hour FTX continuous operation training during three (3) days (totaling 72 training hours). The reflected total contact hours includes the 72 hour FTX during the 18 days of training. Actual contact hours total 192.

¹An 8 hour training day is the standard; exceptions are noted.

²Time for end of course critique included in hours for last written exam in each course.

Key		
Didactic	Did	Instructor/self-paced formats for dissemination of information
Lab/Practical	Lab/ Prac	Demonstration/hands-on practice
Clinical	Clin	Patient care or other supervised work experience
Written or Practical Test	WTest PTest	Formal written/hands-on student assessments, includes time for pre-test review & post-test critique
Other	Other	All other formats for instruction
Required Activities	Reqd	All other non-instruction activities

Section 2: Detailed Course Information

Consolidated Courses:

BMET 101 Electronic Principles I

Course Description: The students are provided with an introductory overview of program curriculum, policies and guidelines to follow while in training. Computer-based training is employed and combined with lecture. Instruction is conducted in the following areas:

Introduction to Electricity - Basic Direct Current (DC) Theory

Identify basic principles of Ohm's Law, Voltage, Current, Resistors, Switches, Batteries and Multimeters

DC Circuits

Identify basic principles of Series Circuits, Parallel Circuits, Series/Parallel Circuits, and Complex DC Circuits

Fundamentals of AC Theory and Test Equipment

Identify basic principles of Basic AC Theory and Test Equipment Use, Function Generator and Oscilloscope Use (Produce Specified Waveforms, Measure Voltage and Frequency, and Analyze Waveforms), and RC and RL Circuits and RC Time Constants

Fundamentals of AC Theory and Test Equipment

Identify basic principles of RC and RL Time Constants, Capacitive/Inductive & LCR Circuits, and Series and Parallel Resonance Circuits

Transformers, Diodes, and Switching Devices

Identify basic principles of Transformers, Diode Junctions, Diode Limiters, and Relays to include Switches and Solenoids

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze the fundamentals and functions of Alternating Current (AC) and Direct Current (DC) circuits and various AC/DC electronic components used in medical equipment relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of Multimeters, Oscilloscopes, and Function Generators.

Course Prerequisite(s): Admission to the Biomedical Equipment Technician program

Distribution of Contact Hours:

Unit #	Unit Title	Did	CBI	Demo	Lab/ Prac	WTest	PTest	Other	Req'd Act.	Total
1	Welcome and Orientation	0	0	0	0	0	0	2	0	2
2	DC Theory	16	39.5	0.5	1.5	0	0.5	0	0	58
3	Written Test 1	0	0	0	0	1.5	0	0	0	1.5
4	AC Theory 1	4	28.5	0.5	1	0	1	0	0	35
5	Written Test 2	0	0	0	0	1.5	0	0	0	1.5
6	AC Theory 2	9	27.5	0	0	0	0	0	0	36.5
7	Written Test 3	0	0	0	0	1.5	0	0	0	1.5
	Total	29	95.5	1	2.5	4.5	1.5	2	0	136

Course Objectives and Levels of Learning:

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 1: Welcome and Orientation					
1.1.1	Welcome & Orientation	Welcome & Orientation			
Unit 2: DC Theory					
2.1.1	DC Theory 1	Given appropriate material, identify general fundamentals of Direct Current (DC) theory with at least 70 percent accuracy.	C2		
2.1.2		Given a multimeter and test circuit, measure voltage, current and resistance with no more than one instructor assist.		P2	
2.2.1	Direct Current (DC) Circuits	Given appropriate material, identify general fundamentals of Direct Current (DC) circuits with at least 70 percent accuracy.	C2		
Unit 3: Written Test 1 - Electronic Principles I					
Unit 4: AC Theory 1					
4.1.1	AC Theory 1	Given appropriate material, identify general fundamentals of AC theory and test equipment with at least 70 percent accuracy.	C2		
4.1.2	Produce Specified Waveforms, Measure Voltage and Frequency, and Analyze Waveforms.	Given an oscilloscope, function generator and test circuit, produce specified waveforms, measure voltage and frequency, and analyze waveforms with no more than two instructor assists.		P2	

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
4.2.1	Alternating Current (AC) Circuits	Given appropriate material, identify general fundamentals of AC circuits with at least 70 percent accuracy.	C2		
Unit 5: Written Test 2 - Electronic Principles I					
Unit 6: AC Theory 2					
6.1.1	Complex AC Circuits	Given appropriate material, identify general fundamentals of complex AC circuits with at least 70 percent accuracy.	C2		
6.2.1	Switching Devices, Transformers, Semiconductors, Diode Limiters, and Electrical Circuits	Given appropriate material, identify general fundamentals of switching devices, transformers, semiconductors, diode limiters, and electrical circuits with at least 70 percent accuracy.	C2		
Unit 7: Written Test 3 - Electronic Principles I					

BMET 102 Electronic Principles II

Course Description: Electronic Principles II further enhances the skills learned in Course 101. Computer-based electronics training is continued throughout this course. Students are exposed to some of the more complex circuits that they will see throughout their stay in the program. Instruction is conducted in the following six areas:

Transistors

Identify basic principles: Common Emitter, Base, and Collector Amplifiers

Power supplies and Amplifiers

Identify basic principles: Rectifiers, Voltage Regulators, Zener Diodes, Multistage Transistors, RC Coupled Transistors, Push-Pull Amplifiers, Field Effect Transistors, and MOSFETs

Transistor Oscillator and Pulse Circuits

Identify basic principles: Hartley, Colpitts, RC Phase Shift, Sawtooth, Coupling Oscillators, Multivibrators, and Schmitt Triggers

Solid State Triggers and Amplifiers

Identify basic principles: SCR, DIAC, TRIAC, UJT, and PUT's

Basic Digital Circuits

Identify basic principles: Gates, Combination Circuits, 555 Timers, D-Type Flip Flops, J-K Flip Flops, Shift Registers, Counters, Digital to Analog Converters, and Data Circuits.

Microprocessors and Motors

Identify general principles of Microprocessor Performance Characteristics and Motors

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze the fundamentals and functions of solid state and integrated circuit devices, digital techniques, and performance techniques of microprocessors and motors used in medical equipment relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of circuit recognition and purpose.

Course Prerequisite(s): BMET 101 Electronic Principles I.

Distribution of Contact Hours:

Unit #	Unit Title	Did	CBI	Demo	Lab/ Prac	WTest	PTest	Other	Req'd Act.	Total
1	Solid State Devices 1	4	40.5	0	0	0	0	0	0	58
2	Written Test 1	0	0	0	0	1.5	0	0	0	1.5
3	Solid State Devices 2	5	28.5	0	0	0	0	0	0	35
4	Written Test 2	0	0	0	0	1.5	0	0	0	1.5
5	Digital Circuits and Motors	5	27.5	0	0	0	0	0	0	36.5
6	Written Test 3	0	0	0	0	1.5	0	0	0	1.5
	Total	29	95.5	0	0	4.5	1.5	2	0	136

Course Objectives and Levels of Learning:

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 1: Solid State Devices 1					
1.1.1	Solid State Devices 1	Given appropriate material, identify general principles of solid state devices with at least 70 percent accuracy.	C2		
1.1.2		Given appropriate material, identify general principles of power supplies with at least 70 percent accuracy.	C2		
1.1.3		Given appropriate material, identify general principles of amplifiers with at least 70 percent accuracy.	C2		
Unit 2: Written Test 1 - Electronic Principles II					
Unit 3: Solid State Devices 2					
3.1.1	Solid State Devices 2	Given appropriate material, identify general principles of oscillators and pulse circuits with at least 70 percent accuracy.	C2		
3.1.2		Given appropriate material, identify general principles of triggers and operational amplifiers with at least 70 percent accuracy.	C2		
Unit 4: Written Test 2 - Electronic Principles II					
Unit 5: Digital Circuits and Motors					
5.1.1	Digital Circuits and Motors	Given appropriate material, identify general principles of digital techniques with at least 70 percent accuracy.	C2		

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
5.1.2		Given appropriate material, identify general principles of microprocessor performance characteristics with at least 70 percent accuracy.	C2		
5.1.3		Given appropriate material, identify general principles of motors with at least 70 percent accuracy.	C2		
Unit 6: Written Test 3 - Electronic Principles II					

BMET 103 Troubleshooting Principles

Course Description: Introduction to Troubleshooting is divided into lecture/discussion phase and performance based hands-on troubleshooting phase.

Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Safety

Identify principles of safety precautions and general safety

Medical Terminology

Identify basic facts of Medical Terminology

Medical Professional Factors

Identify basic facts of Professional Relations, Standards of Ethics, Standards of Conduct, and Primary Care Optimization

Clinical Applications

Identify basic facts of Clinical Applications for Suction/Pressure Units and Ultrasonic Therapy Units

General Troubleshooting

Identify principles of General Troubleshooting

Performance Based Phase - Students will familiarize themselves individually with each unit and progress at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Soldering

Demonstrate Proper Soldering Techniques

Hospital Grade Plugs

Use appropriate tools to wire the plug

Suction/Pressure Unit

Perform Preventive Maintenance Inspection, Perform Calibration Inspection and Isolate Inserted Malfunctions

Ultrasonic Therapy Unit

Perform Preventive Maintenance Inspection, Perform Calibration Inspection and Isolate Inserted Malfunctions

Course Goals: Students should be able to accomplish the following upon completion of the course:

Comprehend medical terminology; understand fundamentals of professional and patient relations to include standards of ethics, conduct, and primary care optimization relevant to the role of the biomedical equipment technician.

Analyze the clinical applications, the principles of general troubleshooting, and demonstrate proper soldering techniques used in medical equipment relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of Test, Measurement and Diagnostic Equipment (TMDE) in performing preventive maintenance inspections, calibrations and isolation of malfunctions on an ultrasonic therapy unit and a suction/pressure unit.

Course Prerequisite(s): BMET 102 Electronic Principles II.

Distribution of Contact Hours:

Unit #	Unit Title	Did	Demo	Lab/ Prac	Clin	WTest	PTest	Other	Req'd Act.	Total
1	Safety	4	0	0	0	0	0	0	0	4
2	Medical Terminology	3	0	0	0	0	0	0	0	3
3	Medical Professional Factors	4	0	0	0	0	0	0	0	4
4	Clinical Applications	3	0	0	0	0	0	0	0	3
5	Troubleshooting	28.5	0	0	0	0	0	0	0	28.5
6	Written Test	0	0	0	0	1.5	0	0	0	1.5
7	Equipment Performance Lab	16	5	72	0	0	0	0	0	92
	Total	57.5	5	72	0	1.5	0	0	0	136

Course Objectives and Levels of Learning:

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 1: Safety					
1.1	General Safety and Safety Precautions.	Without reference, identify principles of general safety and safety precautions with at least 70 percent accuracy.	C2		
Unit 2: Medical Terminology					
2.1	Basic Terms Related to Medical Terminology	Without reference, identify basic terms related to medical terminology with at least 70 percent accuracy.	C1		
Unit 3: Medical Professional Factors					
3.1	Professional Relations, Standards of Ethics, Standards of Conduct and Primary Care Optimization.	Without reference, identify principles pertaining to professional relations, standards of ethics, standards of conduct and primary care optimization with at least 70 percent accuracy.	C1		
Unit 4: Clinical Applications					
4.1	Clinical Applications of Suction/Pressure Units.	Without reference, identify principles about the clinical applications of suction/pressure units with at least 70 percent accuracy.	C1		
4.2	Clinical Applications of an Ultrasonic Therapy Unit.	Without reference, identify principles about clinical applications of an ultrasonic therapy unit with at least 70 percent accuracy.	C1		
Unit 5: Troubleshooting					

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
5.1	General Troubleshooting	Without reference, identify principles of general troubleshooting with at least 70 percent accuracy.	C2		
Unit 6: Written Test - Troubleshooting Principles					
Unit 7: Equipment Performance Lab					
7.1	Demonstrate Proper Soldering Techniques	Given necessary supplies and equipment, demonstrate proper soldering techniques with no more than one instructor assist.		P2	
7.2	Properly Wire a Hospital Grade Plug	Given a hospital grade plug, hand tools, and wire, properly wire a hospital grade plug with no more than one instructor assist.		P2	
7.3	Preventive Maintenance Inspection and Calibration Verification on a Suction/Pressure Unit	Given a suction/pressure unit, manufacturer's literature and test equipment, perform a preventive maintenance inspection and calibration verification with at least 70 percent accuracy.		P2	
7.4	Isolate Malfunction on a Suction/Pressure Unit	Given a suction/pressure unit, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	
7.5	Preventive Maintenance Inspection and Calibration Verification on an Ultrasonic Therapy Unit	Given an ultrasonic therapy unit and manufacturer's literature, perform a preventive maintenance inspection and calibration verification with at least 70 percent accuracy.		P2	
7.6	Isolate Malfunction on an Ultrasonic Therapy Unit	Given an ultrasonic therapy unit, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	

BMET 104 Introduction to Medical Equipment

Course Description: Introduction to Medical Equipment is divided into lecture/discussion phase and performance based, hands-on troubleshooting phase.

Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Acoustics

Identify basic principles of Acoustics and Associated Acoustic Noise Hazards

Anatomy and Physiology (A & P)

Identify principles of A & P as it relates to General Medical Equipment

Clinical Applications

Identify basic facts relating to using Audiometers, Hypo/Hyperthermia Systems, Infant Transport Incubators, and Infusion Pumps

Maintenance

Identify basic facts of the Preventive Maintenance of Audiometers, and Calibration of infant Transport Incubators

Performance Based Phase - Students will familiarize themselves individually with each unit and progress through at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Hypo/Hyperthermia Unit

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Infant Transport Incubator

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Infusion Pump

Perform Preventive Maintenance Inspections, Calibrations and Isolate Inserted Malfunctions

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze the principles of acoustics and associated acoustic noise hazards, principles of A & P as it relates to General Medical Equipment, clinical applications of Audiometers, Hypo/Hyperthermia Systems, Infant Transport Incubators, and Infusion Pumps relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on Audiometers, Hypo/Hyperthermia Unit, Infant Transport Incubator and an Infusion Pump, and Calibrate an Infant Transport Incubator.

Course Prerequisite(s): BMET 103 Troubleshooting Principles.

Distribution of Contact Hours:

Unit #	Unit Title	Did	Demo	Lab/ Prac	Clin	WTest	PTest	Other	Req'd Act.	Total
1	Acoustics	4	0	0	0	0	0	0	0	4
2	Anatomy and Physiology	3	0	0	0	0	0	0	0	3
3	Clinical Applications	8	0	0	0	0	0	0	0	8
4	Maintenance	7.5	0	0	0	0	0	0	0	7.5
5	Written Test	0	0	0	0	1.5	0	0	0	1.5
6	Equipment Performance Lab	28.5	3.5	80	0	0	0	0	0	112
	Total	51	3.5	80	0	1.5	0	0	0	136

Course Objectives and Levels of Learning:

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho- motor	Affective
Unit 1: Acoustics					
1.1	Acoustic Principles	Without reference, identify acoustic principles to include associated noise hazards with at least 70 percent accuracy.	C2		
Unit 2: Anatomy and Physiology					
2.1	Anatomy and Physiology	Without reference, identify principles about anatomy and physiology as they relate to general medical equipment with at least 70 percent accuracy.	C2		
Unit 3: Clinical Applications					
3.1	Clinical Applications of Audiometers	Without reference, identify basic facts about the clinical applications of audiometers with at least 70 percent accuracy.	C1		
3.2	Clinical Applications of Hypo/Hyperthermi a Systems	Without reference, identify basic facts about the clinical applications of hypo/hyperthermia systems with at least 70 percent accuracy.	C1		
3.3	Clinical Applications of Infant Transport Incubators	Without reference, identify basic facts about the clinical applications of infant transport incubators with at least 70 percent accuracy.	C1		
3.4	Clinical Applications of Infusion Pumps	Without reference, identify basic facts about the clinical applications of infusion pumps with at least 70 percent accuracy.	C1		

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 4: Maintenance					
4.1	Preventive Maintenance of Audiometers	Without reference, identify facts pertaining to preventive maintenance of audiometers with at least 70 percent accuracy.	C1		
4.2	Calibration of Infant Transport Incubators	Without reference, identify facts pertaining to calibration of infant transport incubators with at least 70 percent accuracy.	C1		
Unit 5: Written Test - Introduction to Medical Equipment					
Unit 6: Equipment Performance Lab					
6.1	Preventive Maintenance Inspection on a Hypo/Hyperthermia System	Given a hypo/hyperthermia system, manufacturer's literature and test equipment, perform a preventive maintenance inspection with at least 70 percent accuracy.		P2	
6.2	Isolate a Malfunction on a Hypo/Hyperthermia System	Given a hypo/hyperthermia system, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	
6.3	Preventive Maintenance Inspection on an Infant Transport Incubator	Given an infant transport incubator and manufacturer's literature, perform a preventive maintenance inspection with at least 70 percent accuracy.		P2	
6.4	Isolate a Malfunction on an Infant Transport Incubator	Given an infant transport incubator, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	
6.5	Preventive Maintenance Inspection and Calibration Verification on an Infusion Pump	Given an infusion pump, manufacturer's literature and test equipment, perform a preventive maintenance inspection and calibration verification with at least 70 percent accuracy.		P2	
6.6	Isolate a Malfunction on an Infusion Pump	Given an infusion pump, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	

BMET 105 Physiological Monitoring Equipment

Course Description: Physiological Monitoring Equipment is divided into lecture/discussion phase and performance based, hands-on troubleshooting phase.

Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Safety

Identify principles pertaining to Protective Devices, Surge Protectors, Wire Sizing and Electrical Shock Hazards

Electrodes and Transducers

Identify principles of Electrodes and Transducers related to Patient Care

Anatomy and Physiology (A & P)

Identify A & P principles pertaining to Central Patient Monitoring Systems

Clinical Applications

Identify basic facts about Telemetry Systems, Electrocardiographs (ECG), Defibrillators, Diagnostic Ultrasound Doppler Units, Fetal Heart Monitors, Pulse Oximeters, and Invasive/Non-Invasive Blood Pressure Monitors

Maintenance

Identify procedures pertaining to Calibration of Fetal Heart Monitors

Performance Based Phase - Students will familiarize themselves individually with each unit and progress at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Electrocardiograph Unit

Perform Electrical Safety Inspection and Calibration Verification

Defibrillator

Perform Preventive Maintenance Inspections, Calibration Verification, and Isolate Inserted Malfunctions

Fetal Heart Monitor

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Non-Invasive Blood Pressure Monitor

Perform Preventive Maintenance Inspection and Isolate Inserted Malfunctions

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze safety principles pertaining to Protective Devices, Surge Protectors, Wire Sizing, Electrical Shock Hazards, principles and function of Electrodes and Transducers related to Patient Care, and A & P principles pertaining to Central Patient Monitoring Systems relevant to the role of the biomedical equipment technician.

Have knowledge of clinical applications, related physiology and theory of operations about Telemetry Systems, Electrocardiographs (ECG), Defibrillators, Diagnostic Ultrasound Doppler Units, Fetal Heart Monitors, Pulse Oximeters, and Invasive/Non-Invasive Blood Pressure Monitors.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance

inspections, calibrations and isolation of malfunctions on Electrocardiograph Units, Defibrillators, Fetal Heart Monitors, and Non-Invasive Blood Pressure Monitors.

Course Prerequisite(s): BMET 104 Introduction to Medical Equipment.

Distribution of Contact Hours:

Unit #	Unit Title	Did	Demo	Lab/ Prac	Clin	WTest	PTest	Other	Req'd Act.	Total
1	Safety	4	0	0	0	0	0	0	0	4
2	Electrodes and Transducers	3	0	0	0	0	0	0	0	3
3	Anatomy and Physiology	3	0	0	0	0	0	0	0	3
4	Clinical Applications	8	0	0	0	0	0	0	0	8
5	Maintenance	3	0	0	0	0	0	0	0	3
6	Written Test	0	0	0	0	1.5	0	0	0	1.5
7	Equipment Performance Lab	35.5	6	72	0	0	0	0	0	113.5
	Total	56.5	6	72	0	1.5	0	0	0	136

Course Objectives and Levels of Learning:

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho- motor	Affective
Unit 1: Safety					
1.1	Safety	Without reference, identify principles concerning protective devices, surge protectors, wire sizing and electrical shock hazards as they pertain to facility and equipment interface with at least 70 percent accuracy.	C2		
Unit 2: Electrodes and Transducers					
2.1	Electrodes and Transducers	Without reference, identify principles pertaining to the application of electrodes and transducers related to patient care with at least 70 percent accuracy.	C2		
Unit 3: Anatomy and Physiology					
3.1	Anatomy and Physiology	Without reference, identify principles about anatomy and physiology as they relate to physiological monitoring systems with at least 70 percent accuracy.	C2		

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 4: Clinical Applications					
4.1	Clinical Applications of Central Patient Monitoring and Telemetry Systems	Without reference, identify basic facts about the clinical applications of central patient monitoring and telemetry systems with at least 70 percent accuracy.	C1		
4.2	Clinical Applications of Electrocardiographs	Without reference, identify basic facts about the clinical applications of electrocardiographs with at least 70 percent accuracy.	C1		
4.3	Clinical Applications of a Defibrillator	Without reference, identify basic facts about the clinical applications of a defibrillator with at least 70 percent accuracy.	C1		
4.4	Clinical Applications of Diagnostic Ultrasound Doppler Units and Fetal Heart Monitors	Without reference, identify basic facts about the clinical applications of diagnostic ultrasound doppler units and fetal heart monitors with at least 70 percent accuracy.	C1		
4.5	Clinical Applications of Pulse Oximeters and Invasive and Non-Invasive Blood Pressure Monitors	Without reference, identify basic facts about the clinical applications of pulse oximeters and invasive and non-invasive blood pressure monitors with at least 70 percent accuracy.	C1		
Unit 5: Maintenance					
5.1	Calibration of a Fetal Heart Monitor	Without reference, identify procedures pertaining to calibration of a fetal heart monitor with at least 70 percent accuracy.	C2		
Unit 6: Written Test - Physiological Monitoring Equipment					
Unit 7: Equipment Performance Lab					
7.1	Electrical Safety Inspection on an Electrical Safety Analyzer	Given an electrical safety analyzer, manufacturer's literature and an ECG machine, perform an electrical safety inspection with no instructor assistance.		P3	
7.2	Calibration Verification on a Electrocardiograph	Given an electrocardiograph, manufacturer's literature and test equipment, perform a calibration verification with at least 70 percent accuracy.		P2	

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
7.3	Preventive Maintenance Inspection and Calibration Verification on a Defibrillator	Given a defibrillator, manufacturer's literature and test equipment, perform preventive maintenance inspection and calibration verification with at least 70 percent accuracy.		P2	
7.4	Isolate a Malfunction on a Defibrillator	Given a defibrillator, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	
7.5	Perform a Preventive Maintenance Inspection on a Fetal Heart Monitor	Given a fetal heart monitor, manufacturer's literature and test equipment, perform a preventive maintenance inspection with at least 70 percent accuracy.		P2	
7.6	Isolate a Malfunction on a Fetal Heart Monitor	Given a fetal heart monitor, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	
7.7	Preventive Maintenance Inspection on a Non-Invasive Blood Pressure Monitor	Given a non-invasive blood pressure monitor, manufacturer's literature and test equipment, perform a preventive maintenance inspection with at least 70 percent accuracy.		P2	
7.8	Isolate a Malfunction on a Non-Invasive Blood Pressure Monitor	Given a non-invasive blood pressure monitor, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	

BMET 106 Medical Support Equipment

Course Description: Medical Support Equipment is divided into lecture/discussion and performance based, hands-on troubleshooting. The instructional design for this course is group-lock-step. The course consists of a combination of teaching methods: lecture (didactic), demonstration, interactive courseware, performance, and in-depth medical equipment troubleshooting. The instructional sequence may vary from lesson plan sequence because of equipment and space limitations.

Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Hospital Safety Practices

Identify basic facts pertaining to Biological, Chemical, and Fire Hazards

Plumbing

Identify principles relating to Plumbing pertaining to the Facility and Equipment Interface

Anatomy and Physiology (A & P)

Identify principles of A & P as it relates to Laboratory Systems

Clinical Applications

Identify basic facts of Fume and Laminar Flow Hoods, Chemistry Analyzers, Electrolyte Analyzers, Electronic Particle Counters, Blood/Fluid Warmers, Blood Gas Analyzers, Blood Cell Washing Systems and Centrifuges

Maintenance

Identify basic facts of Preventive Maintenance Inspections for Chemistry Analyzers, identify facts for Locating Biomedical Equipment Part Numbers, and determine procedures for Assigning Condition Codes

Performance Based Phase - Students will familiarize themselves individually with each unit and progress at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Blood Gas Analyzer

Perform Preventive Maintenance Inspection, Perform Calibration Verification

Blood/Fluid Warmers

Perform Preventive Maintenance Inspection and Isolate Inserted Malfunctions

Chemistry Analyzers

Isolate Inserted Malfunctions

Centrifuge

Perform Preventive Maintenance Inspection, Perform Calibration Verification and Isolate Inserted Malfunctions

Dental Compressor System

Perform Preventive Maintenance Inspection

Open, Document, and Close a Maintenance Work Order using an Automated Work Order system

Perform Historical Maintenance and Equipment Data File Maintenance Actions

Perform Maintenance using Power and Hand Tools

Demonstrate proper Plumbing connections of the following: Steel, Copper, and Polyvinyl Chloride (PVC)

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze hospital safety practices pertaining to Biological, Chemical, and Fire Hazards, comprehend principles relating to Plumbing in Facility and Equipment Interface, and principles of A & P as it relates to Laboratory Systems relevant to the role of the biomedical equipment technician.

Have knowledge of clinical applications, related physiology, and theory of operations about medical laboratory systems.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on Blood/Fluid Warmers, Chemistry Analyzers, Centrifuges, Blood Gas Analyzers and Dental Compressors.

Open, Document, and Close a Maintenance Work order using an Automated Work Order system, Perform Historical Maintenance and Equipment Data File Maintenance Actions and perform maintenance using power and hand Tools relevant to the role of the biomedical equipment technician in a medical facility.

Course Prerequisite(s): BMET 105 Physiological Monitoring Equipment.

Distribution of Contact Hours:

Unit #	Unit Title	Did	Demo	Lab/ Prac	Clin	WTest	PTest	Other	Req'd Act.	Total
1	Safety	2.5	0	0	0	0	0	0	0	2.5
2	Plumbing	2.5	0	0	0	0	0	0	0	2.5
3	Anatomy and Physiology	3	0	0	0	0	0	0	0	3
4	Clinical Applications	13	0	0	0	0	0	0	0	13
5	Maintenance	5.5	0	0	0	0	0	0	0	5.5
6	Written Test	0	0	0	0	1.5	0	0	0	1.5
7	Equipment Performance Lab	28	8	72	0	0	0	0	0	108
	Total	54.5	8	72	0	1.5	0	0	0	136

Course Objectives and Levels of Learning:

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 1: Safety					
1.1	Hospital Safety Practices	Without reference, identify basic facts about hospital safety practices pertaining to biological, chemical and fire hazards with at least 70 percent accuracy.	C1		
Unit 2: Plumbing					
2.1	Plumbing	Without reference, identify principles relating to plumbing as they pertain to facility and equipment interface with at least 70 percent accuracy.	C2		
Unit 3: Anatomy and Physiology					
3.1	Anatomy and Physiology of Laboratory Equipment	Without reference, identify principles about anatomy and physiology as they relate to laboratory systems with at least 70 percent accuracy.	C2		
Unit 4: Clinical Applications					
4.1	Clinical Applications of Fume and Laminar Flow Hoods	Without reference, identify basic facts about the clinical applications of fume and laminar flow hoods with at least 70 percent accuracy.	C1		
4.2	Clinical Applications of Chemistry Analyzers, Electrolyte Analyzers and Electronic Particle Counters	Without reference, identify basic facts about the clinical applications of chemistry analyzers, electrolyte analyzers and electronic particle counters with at least 70 percent accuracy.	C1		
4.3	Clinical Applications of Blood/Fluid Warmers	Without reference, identify basic facts about the clinical applications of blood/fluid warmers with at least 70 percent accuracy.	C1		
4.4	Clinical Applications of Blood Gas Analyzers, Blood Cell Washing Systems and Centrifuges	Without reference, identify basic facts about the clinical applications of blood gas analyzers, blood cell washing systems and centrifuges with at least 70 percent accuracy.	C1		
Unit 5: Maintenance					
5.1	Preventive Maintenance of Chemistry Analyzers	Without reference, identify facts pertaining to preventive maintenance of chemistry analyzers with at least 70 percent accuracy.	C1		

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
5.2	Locating Biomedical Equipment Part Numbers in both Manufacturer's Literature and Alternate Sources	Without reference, identify facts pertaining to locating biomedical equipment part numbers in both manufacturer's literature and alternate sources with at least 70 percent accuracy.	C1		
5.3	Assigning Condition Codes	Without reference, determine procedures for assigning condition codes with at least 70 percent accuracy.	C2		
Unit 6: Written Test - Medical Support Equipment					
Unit 7: Equipment Performance Lab					
7.1	Preventive Maintenance Inspection and Calibration Verification on a Blood Gas Analyzer	Given a blood gas analyzer, manufacturer's literature and test equipment, perform a preventive maintenance inspection and calibration verification with at least 70 percent accuracy.		P2	
7.2	Preventive Maintenance Inspection on a Blood/Fluid Warmer	Given a blood/fluid warmer, manufacturer's literature and test equipment, perform a preventive maintenance inspection with at least 70 percent accuracy.		P2	
7.3	Isolate Malfunction on a Blood/Fluid Warmer	Given a blood/fluid warmer and manufacturer's literature and test equipment, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	
7.4	Isolate Malfunction on a Chemistry Analyzer	Given a chemistry analyzer, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	
7.5	Preventive Maintenance Inspection and Calibration Verification on a Centrifuge	Given a centrifuge, manufacturer's literature and test equipment, perform preventive maintenance inspection and calibration verification with at least 70 percent accuracy.		P2	
7.6	Isolate Malfunction on a Centrifuge	Given a centrifuge, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
7.7	Perform Maintenance Tasks on a Dental Compressor System	Given a dental compressor system, test equipment and manufacturer's literature, perform selected maintenance tasks with no more than one instructor assist		P2	
7.8	Open, Document and Close a Biomedical Maintenance work order on an Automated Workorder System	Given an automated work order system, open, document and close a biomedical maintenance work order with no more than two instructor assists.		P1	
7.9	Perform Historical Maintenance and Equipment Data File on an Automated Work Order System	Given an automated work order system, perform historical maintenance and equipment data file maintenance actions with no more than two instructor assists.		P1	
7.10	Perform Selected Maintenance Tasks Using Power and Hand Tools	Given the necessary equipment and literature, perform selected maintenance tasks using power and hand tools with no more than one instructor assist.		P2	
7.11	Proper Plumbing Connections	Given necessary supplies, tools and equipment, demonstrate proper plumbing connections, to include steel, copper and polyvinylchloride (PVC), with no more than one instructor assist per connection.		P2	

BMET 107 Dental and Sterilization Equipment

Course Description: Dental and sterilizer systems is divided into lecture/discussion phase and performance based hands-on troubleshooting. The instructional design for this course is group-lock-step. The course consists of a combination of teaching methods: lecture (didactic), demonstration, interactive courseware, performance, and in-depth medical equipment troubleshooting. The instructional sequence may vary from lesson plan sequence because of equipment and space limitations.

Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Safety and Facilities Issues

Identify Basic Principles relating to Vacuum Systems as they pertain to Facility and Equipment Interface

Physical Principles

Identify Mechanical Principles applicable to Biomedical Equipment Maintenance to include Associated Hazards, Principles of Refrigeration Systems, Steam Principles applicable to Biomedical Equipment Maintenance, and Hydraulic and Pneumatic Principles applicable to Biomedical Equipment Maintenance

Anatomy and Physiology (A & P)

Identify principles about A & P as they relate to Dental Treatment Systems

Clinical Applications

Identify Basic Facts of Ultrasonic Cleaners, Flexible and Rigid Fiber Optic Scope Systems and Fiber Optic Scope Washers, Dental Operating Systems and Ultrasonic Prophylaxis Units, and Steam and Plasma Sterilizers.

Maintenance

Identify facts pertaining to Preventive Maintenance of Ultrasonic Cleaners and Identify facts pertaining to Installation of a Dental Operating System

Performance Based Phase - Students will familiarize themselves individually with each unit and progress at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Dental Operating System

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Dental Ultrasonic Prophylaxis

Perform Operational Inspections and Isolate Inserted Malfunctions

Steam Sterilizer

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze and comprehend safety and facility issues, physical principles, anatomy and physiology, clinical applications and maintenance of dental and sterilization systems relevant to the role of the biomedical equipment technician in a medical facility.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance

inspections, calibrations and isolation of malfunctions on Dental Operatory Systems, Dental Prophylaxis and Steam Sterilization Systems.

Course Prerequisite(s): BMET 107 Dental and Sterilization Equipment.

Distribution of Contact Hours:

Unit #	Unit Title	Did	Demo	Lab/ Prac	Clin	WTest	PTest	Other	Req'd Act.	Total
1	Safety and Facilities Issues	1.5	0	0	0	0	0	0	0	1.5
2	Physical Principles	9	0	0	0	0	0	0	0	9
3	Anatomy and Physiology	1.5	0	0	0	0	0	0	0	1.5
4	Clinical Applications	8.5	0	0	0	0	0	0	0	8.5
5	Maintenance	4.5	0	0	0	0	0	0	0	4.5
6	Written Test	0	0	0	0	1.5	0	0	0	1.5
7	Equipment Performance Lab	34.5	3	72	0	0	0	0	0	109.5
	Total	59.5	3	72	0	1.5	0	0	0	136

Course Objectives and Levels of Learning:

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho- motor	Affective
Unit 1: Safety and Facilities Issues					
1.1	Safety and Facilities Issues	Without reference, identify principles relating to vacuum systems as they pertain to facility and equipment interface with at least 70 percent accuracy.	C2		
Unit 2: Physical Principles					
2.1	Mechanical Principles Applicable to Biomedical Equipment Maintenance	Without reference, identify mechanical principles applicable to biomedical equipment maintenance to include associated hazards with at least 70 percent accuracy.	C2		
2.2	Principles of Refrigeration System Applications	Without reference, identify principles of refrigeration system applications with at least 70 percent accuracy.	C2		
2.3	Steam Principles Applicable to Biomedical Equipment Maintenance	Without reference, identify steam principles applicable to biomedical equipment maintenance with at least 70 percent accuracy.	C2		

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
2.4	Hydraulic and Pneumatic Principles Applicable to Biomedical Equipment Maintenance	Without reference, identify hydraulic and pneumatic principles applicable to biomedical equipment maintenance with at least 70 percent accuracy.	C2		
Unit 3: Anatomy and Physiology					
3.1	Anatomy and Physiology in Relation to Dental Treatment Systems	Without reference, identify principles about anatomy and physiology as they relate to dental treatment systems with at least 70 percent accuracy.	C2		
Unit 4: Clinical Applications					
4.1	Clinical Applications of Ultrasonic Cleaners	Without reference, identify basic facts about the clinical applications of ultrasonic cleaners with at least 70 percent accuracy.	C1		
4.2	Clinical Applications of Flexible and Rigid Fiber Optic Scope Systems and Fiber Optic Scope Washers	Without reference, identify facts about the clinical applications of flexible and rigid fiber optic scope systems and fiber optic scope washers with at least 70 percent accuracy.	C1		
4.3	Clinical Applications of Dental Operating Systems and Ultrasonic Prophylaxis Units	Without reference, identify basic facts about the clinical applications of dental operating systems and ultrasonic prophylaxis units with at least 70 percent accuracy.	C1		
4.4	Clinical Applications of Steam and Plasma Sterilizers	Without reference, identify basic facts about the clinical applications of steam and plasma sterilizers with at least 70 percent accuracy.	C1		
Unit 5: Maintenance					
5.1	Preventive Maintenance of Ultrasonic Cleaners	Without reference, identify facts pertaining to preventive maintenance of ultrasonic cleaners with at least 70 percent accuracy.	C1		
5.2	Installation of a Dental Operating System	Without reference, identify facts pertaining to installation of a dental operating system with at least 70 percent accuracy.	C1		

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 6: Written Test - Dental & Sterilization Equipment					
Unit 7: Equipment Performance Lab					
7.1	Perform a Preventive Maintenance Inspection on a Dental Operating System	Given a dental operating system and manufacturer's literature, perform a preventive maintenance inspection with at least 70 percent accuracy.		P2	
7.2	Isolate Malfunction on a Dental Operating System	Given a dental operating system, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	
7.3	Perform an Operational Inspection on a Dental Ultrasonic Prophylaxis	Given a dental ultrasonic prophylaxis, test equipment and manufacturer's literature, perform an operational inspection with no more than one instructor assist.		P2	
7.4	Isolate Malfunction on a Dental Ultrasonic Prophylaxis	Given a dental ultrasonic prophylaxis, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	
7.5	Perform a Preventive Maintenance Inspection on a Steam Sterilizer	Given a steam sterilizer, manufacturer's literature and test equipment, perform a preventive maintenance inspection with at least 70 percent accuracy.		P2	
7.6	Isolate Malfunction on a Steam Sterilizer	Given a steam sterilizer, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	

BMET 108 Surgical Equipment

Course Description: Surgical Equipment is divided into lecture/discussion phase and performance based hands-on troubleshooting phase.

Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Safety and Facilities Issues

Identify principles of Isolated Power, Emergency Power, and Grounding Systems as they pertain to Facility and Equipment Interface

Identify principles of Central Gas Systems as they pertain to Facility and Equipment Interface

Identify principles pertaining to hazards associated with Flammable, Compressed and Occupationally Hazardous Gases

Identify principles pertaining to Hazards Associated with Inhalation Anesthetizing Locations

Anatomy and Physiology (A & P)

Identify principles of A & P as it relates to Respiratory Systems

Clinical Applications

Identify basic facts of Respiration Monitors, Pulmonary Function Analyzers, Volume/Pressure and High Frequency Ventilators, Electrosurgical Unit and Anesthesia Unit

Maintenance

Identify basic facts of Calibration of Volume/Pressure Ventilators

Performance Based Phase - Students will familiarize themselves individually with each unit and progress through at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Pulmonary Function Analyzers

Perform Preventive Maintenance Inspections, Calibration Verification, and Isolate Inserted Malfunctions

Volume/Pressure Ventilators

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Anesthesia Unit

Perform Preventive Maintenance Inspections, Calibration Verification and Isolate Inserted Malfunctions

Electrosurgical Unit

Perform Preventive Maintenance Inspections, Calibration Verification and Isolate Inserted Malfunctions

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze and comprehend safety and facility issues, anatomy and physiology, clinical applications and maintenance of surgical equipment relevant to the role of the biomedical equipment technician in a medical facility.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on Adult Volume/Pressure Ventilators, Anesthesia Systems, Pulmonary Function Analyzers, and Electrosurgical Units.

Course Prerequisite(s): BMET 107 Dental and Sterilization Equipment.

Distribution of Contact Hours:

Unit #	Unit Title	Did	Demo	Lab/ Prac	Clin	WTest	PTest	Other	Req'd Act.	Total
1	Safety and Facilities Issues	6.5	0	0	0	0	0	0	0	6.5
2	Anatomy and Physiology	1	0	0	0	0	0	0	0	1
3	Clinical Applications	5.5	0	0	0	0	0	0	0	5.5
4	Maintenance	2	0	0	0	0	0	0	0	2
5	Written Test	0	0	0	0	1.5	0	0	0	1.5
6	Equipment Performance Lab	35	4.5	80	0	0	0	0	0	119.5
Total		50	4.5	80	0	1.5	0	0	0	136

Course Objectives and Levels of Learning:

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 1: Safety and Facilities Issues					
1.1	Isolated Power, Emergency Power and Grounding	Without reference, identify principles concerning isolated power, emergency power and grounding as they pertain to facility and equipment interface with at least 70 percent accuracy.	C2		
1.2	Central Gas Systems	Without reference, identify principles relating to central gas systems as they pertain to facility and equipment interface with at least 70 percent accuracy.	C2		
1.3	Hazards Associated with Flammable, Compressed and Occupationally Hazardous Gases	Without reference, identify principles pertaining to hazards associated with flammable, compressed and occupationally hazardous gases with at least 70 percent accuracy.	C2		
1.4	Hazards of Inhalation Anesthetizing Locations	Without reference, identify principles about hazards associated with inhalation anesthetizing locations with at least 70 percent accuracy.	C2		

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 2: Anatomy and Physiology					
2.1	Anatomy and Physiology in Relation to Respiratory Systems	Without reference, identify principles about anatomy and physiology as they relate to respiratory systems with at least 70 percent accuracy.	C2		
Unit 3: Clinical Applications					
3.1	Clinical Applications of Respiration Monitors	Without reference, identify basic facts about the clinical applications of respiration monitors with at least 70 percent accuracy.	C1		
3.2	Clinical Applications of Pulmonary Function Analyzers	Without reference, identify basic facts about the clinical applications of pulmonary function analyzers with at least 70 percent accuracy.	C1		
3.3	Clinical Applications of Volume/Pressure and High Frequency Ventilators	Without reference, identify basic facts about the clinical applications of volume/pressure and high frequency ventilators with at least 70 percent accuracy.	C1		
3.4	Clinical Applications of an Electrosurgical Unit	Without reference, identify basic facts about the clinical applications of an electrosurgical unit with at least 70 percent accuracy.	C1		
3.5	Clinical Applications of an Anesthesia Unit	Without reference, identify basic facts about the clinical applications of an anesthesia unit with at least 70 percent accuracy.	C1		
Unit 4: Maintenance					
4.1	Calibration of Volume/Pressure Ventilators	Without reference, identify facts pertaining to calibration of volume/pressure ventilators with at least 70 percent accuracy.	C1		
Unit 5: Written Test - Surgical Equipment					
Unit 6: Equipment Performance Lab					
6.1	Preventive Maintenance Inspection and Calibration Verification on a Pulmonary Function Analyzer	Given a pulmonary function analyzer, manufacturer's literature and test equipment, perform preventive maintenance inspection and calibration verification with at least 70 percent accuracy.		P2	

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
6.2	Isolate a Malfunction on a Pulmonary Function Analyzer	Given a pulmonary function analyzer, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	
6.3	Preventive Maintenance Inspection on a Volume/Pressure Ventilator	Given a volume/pressure ventilator, manufacturer's literature and test equipment, perform a preventive maintenance inspection with at least 70 percent accuracy.		P2	
6.4	Isolate a Malfunction on a Volume/Pressure Ventilator	Given a volume/pressure ventilator, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	
6.5	Preventive Maintenance Inspection and Calibration Verification on an Anesthesia Unit	Given an anesthesia unit, manufacturer's literature and test equipment, perform a preventive maintenance inspection and calibration verification with at least 70 percent accuracy.		P2	
6.6	Isolate a Malfunction on an Anesthesia Unit	Given an anesthesia unit, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	
6.7	Preventive Maintenance Inspection and Calibration Verification on an Electrosurgical Unit	Given an electrosurgical unit and manufacturer's literature and test equipment, perform a preventive maintenance inspection and calibration verification with at least 70 percent accuracy.		P2	
6.8	Isolate a Malfunction on an Electrosurgical Unit	Given an electrosurgical unit, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	

BMET 109 Diagnostic Imaging I

Course Description: Diagnostic Imaging I is divided into lecture/discussion phase and performance based, hands-on troubleshooting phase.

Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Safety and Facilities Issues

Identify principles of Battery Hazards, Single Phase Transformers and Three-Phase Transformers

Radiation and X-Ray Generation

Identify principles of Radiation Principles to include Associated Hazards and X-Ray Generation

Anatomy and Physiology (A & P)

Identify principles of A & P as it relates to Diagnostic Imaging Systems

Clinical Applications

Identify basic facts of Dental Intraoral and Panoramic X-Ray Systems, Fixed and Mobile Radiological and Fluoroscopic X-Ray Systems, Picture Archiving Communication Systems (PACS), Film Processors, and Automixers

Maintenance

Identify basic facts of Calibration for Dental Panoramic X-Ray Systems

Performance Based Phase - Students will familiarize themselves individually with each unit and progress through at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Film Processor

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Dental Panoramic X-Ray System

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Mobile X-Ray System

Perform Preventive Maintenance Inspections, Calibration Verification, and Isolate Inserted Malfunctions

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze and comprehend safety and facility issues, radiation and X-ray generation, anatomy and physiology, clinical applications and maintenance of diagnostic imaging equipment relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on Mobile Radiological Systems, Dental Panoramic Systems and Wet Film Processors.

Course Prerequisite(s): BMET 108 Surgical Equipment.

Distribution of Contact Hours:

Unit #	Unit Title	Did	Demo	Lab/ Prac	Clin	WTest	PTest	Other	Req'd Act.	Total
1	Safety and Facilities Issues	4	0	0	0	0	0	0	0	4
2	Radiation and X-Ray Principles	6	0	0	0	0	0	0	0	6
3	Anatomy and Physiology	3	0	0	0	0	0	0	0	3
4	Clinical Applications	7.5	0	0	0	0	0	0	0	7.5
5	Maintenance	3	0	0	0	0	0	0	0	3
6	Written Test	0	0	0	0	1.5	0	0	0	1.5
7	Equipment Performance Lab	43.5	3.5	64	0	0	0	0	0	111
	Total	67	3.5	64	0	1.5	0	0	0	136

Course Objectives and Levels of Learning:

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 1: Safety and Facilities Issues					
1.1	Battery Hazards, Single and Three Phase Transformers	Without reference, identify principles concerning battery hazards, single and three phase transformers as they pertain to facility and equipment interface with at least 70 percent accuracy.	C2		
Unit 2: Radiation and X-Ray Principles					
2.1	Radiation Principles to include Associated Hazards Applicable to Biomedical Equipment Maintenance	Without reference, identify radiation principles to include associated hazards applicable to biomedical equipment maintenance with at least 70 percent accuracy.	C2		
2.2	Principles of X-Ray Generation	Without reference, identify principles of X-ray generation with at least 70 percent accuracy.	C2		
Unit 3: Anatomy and Physiology					
3.1	Anatomy and Physiology in Relation to Diagnostic Imaging Systems	Without reference, identify principles about anatomy and physiology as they relate to diagnostic imaging systems with at least 70 percent accuracy.	C2		

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 4: Clinical Applications					
4.1	Clinical Applications of Dental Intraoral and Panoramic X-Ray Systems	Without reference, identify basic facts about the clinical applications of dental intraoral and panoramic X-ray systems with at least 70 percent accuracy.	C1		
4.2	Clinical Applications of Fixed, Mobile, Radiological and Fluoroscopic X-Ray Systems	Without reference, identify basic facts about the clinical applications of fixed, mobile, radiological and fluoroscopic X-ray systems with at least 70 percent accuracy.	C1		
4.3	Clinical Applications of Picture Archiving Communication Systems (PACS)	Without reference, identify basic facts about the clinical applications of picture archiving communication systems (PACS) with at least 70 percent accuracy.	C1		
4.4	Clinical Applications of Film Processors to Include Chemical Auto Mixers	Without reference, identify basic facts about the clinical applications of film processors to include chemical auto mixers with at least 70 percent accuracy.	C1		
Unit 5: Maintenance					
5.1	Calibration of a Dental Panoramic X-Ray System	Without reference, identify procedures pertaining to the calibration of a dental panoramic X-ray system with at least 70 percent accuracy.	C2		
Unit 6: Written Test - Diagnostic Imaging I					
Unit 7: Equipment Performance Lab					
7.1	Preventive Maintenance Inspection on a Film Processor	Given a film processor manufacturer's literature and test equipment, perform a preventive maintenance inspection with at least 70 percent accuracy.		P2	
7.2	Isolate a Malfunction on a Film Processor	Given a film processor, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	
7.3	Preventive Maintenance Inspection on a Dental Panoramic X-Ray System	Given a dental panoramic X-ray system, manufacturer's literature and test equipment, perform a preventive maintenance inspection with at least 70 percent accuracy.		P2	

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
7.4	Isolate a Malfunction on a Dental Panoramic X-Ray System	Given a dental panoramic X-ray system, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	
7.5	Preventive Maintenance Inspection and Calibration Verification on a Mobile X-Ray System	Given a mobile X-ray system, manufacturer's literature and test equipment, perform a preventive maintenance inspection and calibration verification with at least 70 percent accuracy.		P2	
7.6	Isolate a Malfunction on a Mobile X-Ray System	Given a mobile X-ray system, test equipment and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	

BMET 110 Diagnostic Imaging II

Course Description: Diagnostic Imaging II is divided into lecture/discussion phase and performance based, hands-on troubleshooting phase:

Lecture/Discussion Phase The lecture portion encompasses the following areas:

Safety

Identify basic facts of Hospital Safety Practices pertaining to Laser Hazards

Ultrasound, Laser, and Optical Principles

Identify principles of Laser, Ultrasound and Optical principles

Clinical Applications

Identify basic facts pertaining to Computed Tomography (CT), Digital Radiography (DR) and Computed Radiography (CR) Plate Readers, Mammography, Laser Imagers, Medical Laser Systems, Diagnostic Ultrasound Imaging Systems, Nuclear Medicine, and Magnetic Resonance Imaging (MRI)

Maintenance

Identify procedures pertaining to Preventive Maintenance Inspections of Fixed Radiological X-Ray Systems, and Calibration of Diagnostic Ultrasound Imaging Systems

Performance Based Phase - Students will familiarize themselves individually with each unit and progress through at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Diagnostic Ultrasound Units

Perform Preventive Maintenance Inspections on Diagnostic Ultrasound Units

Computed Radiography Plate Readers

Perform Preventive Maintenance Inspections on Computed Radiography Plate Readers

Mobile Fluoroscopic X-Ray Systems

Perform Preventive Maintenance Inspections and Calibration Verification

Fixed Radiological X-Ray Systems

Isolate Inserted Malfunctions on Fixed Radiological X-Ray Systems

Fixed Fluoroscopic X-Ray Systems

Isolate Inserted Malfunctions on Fixed Fluoroscopic X-Ray Systems

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze and comprehend safety, ultrasound, laser, and optical principles, clinical applications and maintenance of diagnostic imaging equipment relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of Test, Measurement and Diagnostic Equipment (TMDE) in performing preventive maintenance inspections, calibrations and isolation of malfunctions on Fixed Radiological/Fluoroscopic Systems, Computed Radiographic Plate Readers, Diagnostic Ultrasound Systems and Mobile Fluoroscopic Systems.

Course Prerequisite(s): BMET 109 Diagnostic Imaging I.

Distribution of Contact Hours:

Unit #	Unit Title	Did	Demo	Lab/ Prac	Clin	WTest	PTest	Other	Req'd Act.	Total
1	Safety	2	0	0	0	0	0	0	0	2
2	Ultrasound, Laser and Optical Principles	3	0	0	0	0	0	0	0	3
3	Clinical Applications	10	0	0	0	0	0	0	0	10
4	Maintenance	5.5	0	0	0	0	0	0	0	5.5
5	Written Test	0	0	0	0	1.5	0	0	0	1.5
6	Equipment Performance Lab	40	2	72	0	0	0	0	0	114
	Total	60.5	2	72	0	1.5	0	0	0	136

Course Objectives and Levels of Learning:

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho- motor	Affective
Unit 1: Safety					
1.1	Hospital Safety Practices Pertaining to Laser Hazards	Without reference, identify basic facts about hospital safety practices pertaining to laser hazards with at least 70 percent accuracy.	C1		
Unit 2: Ultrasound, Laser and Optical Principles					
2.1	Laser Principles Applicable to Biomedical Equipment Maintenance	Without reference, identify laser principles applicable to biomedical equipment maintenance with at least 70 percent accuracy.	C2		
2.2	Ultrasound Principles Applicable to Biomedical Equipment Maintenance	Without reference, identify ultrasound principles applicable to biomedical equipment maintenance with at least 70 percent accuracy.	C2		
2.3	Identify Optical Principles Applicable to Biomedical Equipment Maintenance	Without reference, identify optical principles applicable to biomedical equipment maintenance with at least 70 percent accuracy.	C2		

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 3: Clinical Applications					
3.1	Clinical Applications of Digital Radiography and Computed Radiography Plate Readers	Without reference, identify basic facts about the clinical applications of digital radiography and computed radiography plate readers with at least 70 percent accuracy.	C1		
3.2	Clinical Applications and Principles of Computed Tomography	Without reference, identify basic facts about the clinical applications and principles of computed tomography with at least 70 percent accuracy.	C1		
3.3	Clinical Applications of Mammography	Without reference, identify basic facts about the clinical applications of mammography with at least 70 percent accuracy.	C1		
3.4	Clinical Applications of Laser Imagers	Without reference, identify basic facts about the clinical applications of laser imagers with at least 70 percent accuracy.	C1		
3.5	Clinical Applications of Medical Laser Systems	Without reference, identify basic facts about the clinical applications of medical laser systems with at least 70 percent accuracy.	C1		
3.6	Clinical Applications of Diagnostic Ultrasound Imaging Systems	Without reference, identify basic facts about the clinical applications of diagnostic ultrasound imaging systems with at least 70 percent accuracy.	C1		
3.7	Clinical Applications and Principles of Nuclear Medicine	Without reference, identify basic facts about the clinical applications and principles of nuclear medicine with at least 70 percent accuracy.	C1		
3.8	Clinical Applications and Principles of Magnetic Resonance Imaging	Without reference, identify basic facts about the clinical applications and principles of magnetic resonance imaging with at least 70 percent accuracy.	C1		
Unit 4: Maintenance					
4.1	Preventive Maintenance of Fixed Radiological X-Ray Systems	Without reference, identify procedures pertaining to preventive maintenance of fixed radiological X-ray systems with at least 70 percent accuracy.	C2		

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
4.2	Calibration of Diagnostic Ultrasound Imaging Systems	Without reference, identify procedures pertaining to calibration of diagnostic ultrasound imaging systems with at least 70 percent accuracy.	C2		
Unit 5: Written Test - Diagnostic Imaging II					
Unit 6: Equipment Performance Lab					
6.1	Perform a Preventive Maintenance Inspection on a Diagnostic Ultrasound Imaging System	Given a diagnostic ultrasound imaging system, manufacturer's literature and test equipment, perform a preventive maintenance inspection with at least 70 percent accuracy.		P2	
6.2	Perform a Preventive Maintenance Inspection on a Computed Radiography Plate Reader	Given a computed radiography plate reader, manufacturer's literature and test equipment, perform a preventive maintenance inspection with at least 70 percent accuracy.		P2	
6.3	Perform a Preventive Maintenance Inspection and Calibration Verification on a Mobile Fluoroscopic System	Given a mobile fluoroscopic system, manufacturer's literature and test equipment, perform a preventive maintenance inspection and calibration verification with at least 70 percent accuracy.		P2	
6.4	Isolate Malfunction on a Fixed Radiological X-Ray System	Given a fixed radiological/fluoroscopic X-ray system, test equipment and manufacturer's literature, isolate one radiological instructor inserted malfunction with at least 70 percent accuracy.		P2	
6.5	Isolate Malfunction on a Fixed Fluoroscopic X-Ray System	Given a fixed radiological/fluoroscopic X-ray system, test equipment and manufacturer's literature, isolate one fluoroscopic instructor inserted malfunction with at least 70 percent accuracy.		P2	

BMET 111 Information Technology and Field Equipment

Course Description: Information Technology and Field Equipment is divided into lecture/discussion phase and performance based, hands-on troubleshooting phase. Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Safety

Identify basic facts pertaining to Safe Medical Devices Act (SMDA) to include accident and hazard reporting

Facilities Issues

Identify basic facts about Facilities Management Programs, Structural Requirements to include Architectural and Engineering Drawings, Environmental Control Systems, The Joint Commission Environment of Care Standards and Plans

Computer Principles

Identify general operating principles of Central Processing Units, Input/Output Devices
Identify principles about Computer Networks

Field Equipment Systems Applications

Identify System Application principles of Field Generators
Identify basic facts about applications of Field Power Distribution Systems, DOD International Standards Organization (ISO) Expandable Shelter Systems, and Environmental Control Units
Identify principles of systems applications of Oxygen Storage and Generation Systems

Maintenance

Identify facts pertaining to Installation and Site Preparation for DOD ISO Expandable Shelters
Identify facts pertaining to performing Organizational Maintenance on Power Production and Distribution System

Performance Based Phase - Students will familiarize themselves individually with each unit and progress through at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Information Systems Performance Lab

Isolate Inserted Malfunctions on a Computer System and Software

Field Generator

Perform Operational Inspections on a Field Generator

Power Distribution System

Perform Operational Inspections on a Power Distribution System

DOD ISO Expandable Shelter

Perform Operational Inspection and Organizational Maintenance on a DOD ISO Expandable Shelter

Environmental Control Unit

Perform Installation, Operational Inspections, and Organizational Maintenance on an Environmental Control Unit

Oxygen Storage and Generation System

Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze and comprehend safety, facility issues, computer principles, field equipment systems applications and maintenance of information technology and field equipment relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on Information Technology Systems and Field Equipment.

Course Prerequisite(s): BMET 110 Diagnostic Imaging II.

Distribution of Contact Hours:

Unit #	Unit Title	Did	Demo	Lab/ Prac	Clin	WTest	PTest	Other	Req'd Act.	Total
1	Safety	3	0	0	0	0	0	0	0	3
2	Facilities Issues	6	0	0	0	0	0	0	0	6
3	Computer Principles	9	0	0	0	0	0	0	0	9
4	Written Test 1	0	0	0	0	1.5	0	0	0	1.5
5	Information Systems Performance Lab	4	0	20	0	0	0	0	0	24
6	Field Equipment Systems Applications	9.5	0	0	0	0	0	0	0	9.5
7	Maintenance	5	0	0	0	0	0	0	0	5
8	Written Test 2	0	0	0	0	1.5	0	0	0	1.5
9	Field Equipment Performance Lab	13	15	48.5	0	0	0	0	0	76.5
	Total	49.5	15	68.5	0	3	0	0	0	136

Course Objectives and Levels of Learning:

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 1: Safety					
1.1	Safe Medical Devices Act (SMDA)	Without reference, identify basic facts about the Safe Medical Devices Act (SMDA) to include accident and hazard reporting with at least 70 percent accuracy.	C1		
Unit 2: Facilities Issues					
2.1	Facilities Management Programs	Without reference, identify basic facts about facilities management programs with at least 70 percent accuracy.	C1		
2.2	Structural Requirements to Include Architectural and Engineering Drawings	Without reference, identify basic facts relating to structural requirements to include architectural and engineering drawings with at least 70 percent accuracy.	C2		
2.3	Environmental Control Systems as They Pertain to Facility and Equipment Interface	Without reference, identify basic facts relating to environmental control systems as they pertain to facility and equipment interface with at least 70 percent accuracy.	C2		
2.4	Joint Commission on Environment of Care, Standards, and Plans	Without reference, identify basic facts about Joint Commission, Environment of Care standards and plans with at least 70 percent accuracy.	C1		
Unit 3: Computer Principles					
3.1	Central Processing Unit and Input/Output Devices	Without reference, identify general operating principles of a central processing unit and input/output devices pertaining to computer systems with at least 70 percent accuracy.	C2		
3.2	Computer Networks	Without reference, identify principles about computer networks with at least 70 percent accuracy.	C2		
Unit 4: Written Test 1 - Information Technology and Field Equipment					

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 5: Information Systems Performance Lab					
5.1	Isolate a Malfunction on a Computer System	Given a computer system, software, and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	
Unit 6: Field Equipment Systems Applications					
6.1	Field Generators	Without reference, identify system application principles of field generators with at least 70 percent accuracy.	C2		
6.2	Field Power Distribution Systems	Without reference, identify principles about the applications of field power distribution systems with at least 70 percent accuracy.	C1		
6.3	DoD International Standards Organization (ISO) Expandable Shelter System	Without reference, identify principles about the applications of the DoD international standards organization (ISO) expandable shelter system with at least 70 percent accuracy.	C1		
6.4	Environmental Control Units to Include Collectively Protected Versions	Without reference, identify basic facts and terms about the applications of environmental control units to include collectively protected versions with at least 70 percent accuracy.	C1		
6.5	Oxygen Storage and Generation Systems	Without reference, identify principles of system applications of oxygen storage and generation systems with at least 70 percent accuracy.	C2		
Unit 7: Maintenance					
7.1	Installation and Site Preparation for DoD ISO Expandable Shelters	Without reference, identify facts pertaining to installation and site preparation for DoD ISO expandable shelters with at least 70 percent accuracy.	C1		
7.2	Organizational Maintenance of Power Production and Distribution Systems	Without reference, identify facts pertaining to performing organizational maintenance of power production and distribution systems with at least 70 percent accuracy.	C1		
Unit 8: Written Test 2 - Information Technology and Field Equipment					

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 9: Field Equipment Performance Lab					
9.1	Operational Inspection on a Field Generator	Given a field generator and manufacturer's literature, perform an operational inspection with no more than one instructor assist.		P2	
9.2	Operational Inspection on Components of a Power Distribution System	Given components of a power distribution system and manufacturer's literature, perform an operational inspection with no more than one instructor assist.		P2	
9.3	Operational Inspection and Organizational Maintenance on a DoD ISO Expandable Shelter	Given a DoD ISO expandable shelter and manufacturer's literature, perform an operational inspection and organizational maintenance with no more than two instructor assists.		P1	
9.4	Installation, Operational Inspection, and Organizational Maintenance on an Environmental Control Unit	Given an environmental control unit and manufacturer's literature, perform installation, operational inspection and organizational maintenance with no more than two instructor assists.		P1	
9.5	Preventive Maintenance Inspection on an Oxygen Storage and Generation System	Given an oxygen storage and generation system and manufacturer's literature, perform a preventive maintenance inspection with at least 70 percent accuracy.		P2	
9.6	Isolate a Malfunction on an Oxygen Storage and Generation System	Given an oxygen storage and generation system and manufacturer's literature, isolate one instructor inserted malfunction with at least 70 percent accuracy.		P2	

Air Force Service Specific

BMET 112F Air Force Service Specific

Course Description: The final segment of instruction for Air Force students prior to graduating the BMET training program. In this course, students are segregated by service affiliation for specific training requirements. These requirements are identified as critical by their service training proponent and not addressed within the core course curriculum. The Air Force Service Specific course is designed to train and evaluate Air Force students on medical equipment and maintenance management procedures in a hospital or field environment.

Lecture/Discussion Phase - The lecture portion encompasses the following areas:

Air Force Medical Maintenance Management and Administration

- Identify basic facts relating to the Air Force Medical Service Mission, Organization and Function

- Identify basic facts relating to the Organizational Structure of the Biomedical Equipment Maintenance Program

- Identify basic facts relating to the Duties and Responsibilities of the AFMLO and MERC

- Identify basic facts relating to the Duties of the Biomedical Equipment Repairman

- Define Responsibilities of the Air Force Management of Government Property

- Identify principles of General Preventive Maintenance Techniques

- Determine procedures for Performing Initial Inspections

- Identify basic facts about Repair Part Inventory Requirements

Air Force Deployable Field Duties

- Identify basic facts about System Applications, Operational Inspections, Organizational Maintenance, and Installation of Lighting Systems

- Identify basic facts about System Applications and Organizational Maintenance of Tactical shelters

- Identify basic facts about System Applications Field Communications Equipment

- Identify basic facts about Preparing Equipment for War Reserve Material Storage

- Identify basic facts about System Applications of Water Recovery Systems

Air Force Service Specific Field Duties

- Identify basic facts about Clinical Applications of Stress Test Systems

Performance Based Phase - Students will familiarize themselves individually with each unit and progress through at their own pace through the use of instructor inserted malfunctions. To successfully complete this course, students must demonstrate appropriate knowledge in each of the following tasks:

Power Distribution System

- Perform Installation of a Power Distribution System

Power Production (Generator)

- Perform Installation of Power Production Systems

Tentage

- Perform Site Preparation, Install, and Prepare for Shipment of Tactical Shelters

Electrocardiograph Units

- Perform Preventive Maintenance Inspections and Isolate Inserted Malfunctions

Physiological/Vital Signs Monitoring Systems

Perform Operational and Preventive Maintenance Inspections and Calibration
Audiometers

Perform Operational and Preventive Maintenance Inspections and Calibration

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze and comprehend Air Force Medical Maintenance Management and Administration, Air Force Deployable Field Duties, and Air Force Service Specific Field Duties relevant to the role of the Biomedical Equipment Technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on Tentage and Air Force field/deployable medical equipment.

Course Prerequisite(s): BMET 111 Information Technology and Field Equipment.

Distribution of Contact Hours:

Unit #	Unit Title	Did	Demo	Lab/ Prac	Clin	WTest	PTest	Other	Req'd Act.	Total
1	Air Force Medical Maintenance Management and Administration	22	0	0	0	0	0	0	0	22
2	Air Force Deployable Field Duties	21	0	42	0	0	0	0	0	63
3	Air Force Service Specific Field Duties	20	0	36	0	0	0	0	0	56
4	Written Test	0	0	0	0	1.5	0	0	0	1.5
5	Program Feedback and Graduation	0	0	1.5	0	0	0	0	0	1.5
Total		63	0	79.5	0	1.5	0	0	0	144

Course Objectives and Levels of Learning:

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 1: Air Force Medical Maintenance Management and Administration					
1.1	AF Medical Service Mission, Organization and Function; Organizational Structure of the Biomedical Equipment Maintenance Program; Duties and Responsibilities of AFMLO and MERC; and Duties of Biomedical Equipment Repairman	Without reference, identify basic facts and terms relating to AF medical service mission, organization and function; organizational structure of the biomedical equipment maintenance program; duties and responsibilities of AFMLO and MERC; and duties of biomedical equipment repairman with at least 70 percent accuracy.	C1		
1.2	Air Force Management of Government Property	Without reference, define responsibilities of the Air Force management of government property with at least 70 percent accuracy.	C1		
1.3	General Preventive Maintenance Techniques	Without reference, identify principles of general preventive maintenance techniques with at least 70 percent accuracy.	C2		
1.4	Initial Inspections	Without reference, determine procedures for performing initial inspections with at least 70 percent accuracy.	C2		
1.5	Repair Parts Inventory Requirements	Without reference, identify basic facts about repair parts inventory requirements with at least 70 percent accuracy.	C1		
Unit 2: Air Force Deployable Field Duties					
2.1	System Application of Lighting Systems	Given manufacture's literature, identify basic facts and statements about system application of lighting systems with at least 70 percent accuracy.	C1		
2.2	Operational Inspection, Organizational Maintenance, and Installation of Lighting Systems	Without reference, identify basic facts and statements about performing operational inspection, organizational maintenance, and installation of lighting systems with at least 70 percent accuracy.	C1		

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
2.3	System Applications of Tactical Shelters, to Include Collectively Protected Versions	Given manufacture's literature, identify basic facts and statements about system applications of tactical shelters, to include collectively protected versions with at least 70 percent accuracy.	C1		
2.4	Organizational Maintenance of Tactical Shelters	Without reference, identify basic facts and statements about performing organizational maintenance of tactical shelters with at least 70 percent accuracy.	C1		
2.5	System Application of Field Communications Equipment	Given lecture and manufacture's literature, identify basic facts and statements about system application of field communications equipment with at least 70 percent accuracy	C1		
2.6	Preparing Equipment for War Reserve Materiel (WRM) Storage	Without reference, identify basic facts and statements about preparing equipment for War Reserve Materiel (WRM) storage with at least 70 percent accuracy.	C1		
2.7	System Application of Water Recovery Systems	Without reference, identify basic facts and statements about system application of water recovery systems with at least 70 percent accuracy.	C1		
2.8	Working as a Group Install a Power Distribution System	Working as a group and given a power distribution system, manufacture's literature and necessary test equipment, perform installation on a power distribution system IAW manufacturer's literature allowing one instructor assist		P2	
2.9	Working as a Group Install a Power Production Generator	Working as a group and given power production (generator) and manufacturer's literature, install power production IAW manufacturer's literature allowing one instructor assist.		P2	
2.10	Working as a Group, Prepare Site, Install, and Prepare for Shipment Tactical Shelters	Working as a group and given tentage, necessary equipment, and manufacturer's literature, prepare site, install, and prepare for shipment, tactical shelters IAW manufacturer's literature allowing one instructor assist.		P1	

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 3: Air Force Service Specific Field Duties					
3.1	Clinical Applications of Stress Test Systems and Treadmills	Without reference, identify basic facts about the clinical applications of stress test systems and treadmills with at least 70 percent accuracy.	C1		
3.2	Preventive Maintenance Inspection and Isolate Malfunctions on an Electrocardiograph	Given an electrocardiograph, manufacturer's literature and necessary test equipment, perform preventive maintenance inspection and isolate malfunctions on and electrocardiograph IAW manufacturer's literature allowing one instructor assist.		P2	
3.3	Operational and Preventive Maintenance Inspection and Calibration on Physiological/Vital Signs Monitoring Systems	Given physiological/vital signs monitoring systems, necessary test equipment, and manufacturer's literature, perform a non-invasive blood pressure calibration verification IAW manufacturer's literature allowing one instructor assist.		P2	
3.4	Operational and Preventive Maintenance Inspection and Calibration on an Audiometer System	Given an audiometer, necessary test equipment, and manufacturer's literature, perform a calibration verification IAW manufacturer's literature allowing one instructor assist.		P2	
Unit 4: Written Test					
Unit 5: Program Feedback and Graduation					
5.1	Program Feedback and Graduation	Participate in Program Feedback Graduation		P1	

R1 Expeditionary Medical Readiness Course (EMRC)

Course Description: This Air Force specific course provides practical and didactic training, with an orientation to continuing Medical Readiness Training (MRT) core topics to include: Active Duty, AFRC, and ANG personnel attending 3-level medical/dental AFSC awarding courses. This course will provide training in emergency medical readiness and deployment skills training in a field hospital environment.

Course Goals: Students will gain emergency medical readiness and deployment skills in a field hospital's surgical suite and sterile processing and supply areas.

Course Prerequisite(s): None

NOTE: BMET R1 course is taken by students at Camp Bullis prior to starting BMET 101. These 16 hours were not captured on the 2008 RRA, but are required training hours per AFI 41-106, Chapter 6 para 6.1.1. These 16 hours are not listed in the program length table of this CP.

Distribution of Contact Hours:

Unit #	Unit Title	Did	Lab/ Prac	Clin	WTest	PTest	Other	Req'd Act.	Total
1	Expeditionary Medical Readiness Course	2	0	0	0	0	0	0	2
2	Site Selection/ Shelter Assembly	2	4	0	0	0	0	0	6
3	Threat and Future Battlefield Environment	3	0	0	0	0	0	0	3
4	Medical Effects of NBC Warfare	1.5	0	0	0	0	0	0	1.5
5	Casualty Movement	0	3	0	0	0	0	0	3
6	Administration Time	0	0	0	0	0	0	0.5	0.5
Total		8.5	7	0	0	0	0	0.5	16

Course Objectives and Levels of Learning:

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 1: Expeditionary Medical Readiness Course					
1.1	USAF Medical Service Mission and Doctrine	Identify facts and principles pertaining to USAF Medical Service Mission and Doctrine.	C1		
1.2	Combat Stress Control	Identify facts and principles of combat stress control management and Brevity Immediacy Centrality Expectancy Proximity Simplicity (BICEPS).	C1		

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 2: Site Selection/ Shelter Assembly					
2.1	Erect a Shelter	Working as a team, erect an Alaska Small Shelter System (AKSS).		P2	
2.2	Field Sanitation	Identify facts and principles of field sanitation, hygiene and disease prevention.	C1		
2.3	Strike a Shelter	Working as a team, strike an Alaska Small Shelter System (AKSS).		P2	
Unit 3: Threat and Future Battlefield Environment					
3.1	Threat	Identify facts and principles of foreign and domestic sources of danger to U.S. Forces.	C1		
3.2	Future Battlefield Environment	Identify facts and principles of future battlefield settings, new weaponry and impact to health protection.	C1		
3.3	Command, Control, Communication and Medical Intelligence	Identify facts and principles of systems directly related to day-to-day operations in support of operational missions.	C1		
Unit 4: Medical Effects of NBC Warfare					
4.1.	Medical Effects of NBC Warfare	Identify medical effects of NBC warfare.	C1		
4.2	Depleted Uranium	Identify facts and principles associated with diagnosing and treating casualties wounded/ contaminated by Depleted Uranium (DU).	C1		
Unit 5: Casualty Movement					
5.1	Litter Transport	Demonstrate patient transport by using the correct litter commands.		P2	
5.2	Vehicle Loading/ Unloading	Demonstrate transport sequences and vehicle loading/unloading procedures.		P2	
5.3	Triage	Demonstrate proper triage techniques and management of mass casualties.		P2	

Army Service Specific

BMET 112A Army Service Specific

Course Description: This is the final segment of instruction for Army students prior to graduating the BMET training program. In this course, students are segregated by Service affiliation for specific training requirements. These requirements are identified as critical by the Service training proponent and not addressed within the core course curriculum. The Army Service Specific course is designed to train and evaluate Army students on medical equipment and maintenance management procedures in a hospital or field environment.

The Army Service Specific course is designed to train and evaluate Army students on medical equipment and maintenance management procedures in a field environment. Students are placed into a tactical environment, where they are evaluated in setting up and maintaining the maintenance section of a medical unit. The field training environment combines the technical, managerial and tactical training they have received. Additional scenarios are added to increase the realism of the training that is provided. Our primary goal is to prepare the soldiers to perform their duties at their gaining units with as little supervision as possible. The course is 18 days long and includes a 72 hour continuous operations mission during which the evaluation period takes place.

The following is a sample of what is required during the final segment of the course:

- Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE)

 - CBRNE Patient Decontamination in a Field Environment

- Field Equipment Performance Lab

 - Defibrillator

 - Perform a Technical Inspection (TI)

 - Vital Signs Monitoring System

 - Perform Preventive Maintenance Inspections, Calibration Verification, and Repair Faults

 - Fixed Dental X-Ray System

 - Perform Preventive Maintenance Inspections, Calibration Verification, and Repair Faults

 - Digital Dental Processor

 - Perform Preventive Maintenance Inspections, Calibration Verification, and Repair Faults

 - Medical Refrigeration System

 - Perform Preventive Maintenance Inspections

 - Surgical Table

 - Perform Preventive Maintenance Inspections and Repair Faults

 - Mobile X-Ray System

 - Perform Unpack, Set up, and Operational Inspections

 - Dental Operating System

 - Perform Unpack, Set up, and Operational Inspections

Course Goals: Students will be able to accomplish the following upon completion of the course:

- Analyze and comprehend Army medical equipment and maintenance management procedures relevant to the role of the biomedical equipment technician.

Have the technical proficiency and skills required to comprehend, relate, and evaluate information obtained through the use of TMDE in performing preventive maintenance inspections, calibrations and isolation of malfunctions on medical equipment in a hospital or field environment

Course Prerequisite(s): BMET 111 Information Technology and Field Equipment.

Distribution of Contact Hours

Unit #	Unit Title	Did	Demo	Lab/ Prac	Clin	WTest	PTest	Other	Req'd Act.	Total
1	Field Training Site Orientation	12	0	0	0	0	0	0	16	28
2	Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE)	8	0	4	0	0	0	0	0	12
3	Field Equipment Performance Lab	36.5	6	38	0	0	0	0	0	80.5
4	Combat Survival Skills	6	0	6	0	0	0	0	0	12
5	Field Training Exercise (FTX)*	0	0	72*	0	0	0	0	0	72*
6	Army Physical Fitness Test (APFT)	0	0	0	0	0	2	0	0	2
7	Program Feedback and Graduation	0	0	1.5	0	0	0	0	0	1.5
Total		62.5	6	121.5*	0	0	2	0	16	208*

* Deviation from the standard 8-hour training day; 24-hour FTX continuous operation training during three (3) days (totaling 72 training hours). The reflected total contact hours includes the 72-hour FTX during the 18 days of training. Actual contact hours total 192

Course Objectives and Levels of Learning:

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 1: Field Training Site Orientation					
1.1	Field Training Site Orientation	Identify basic facts of Field Training.	C1		
Unit 2: Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE)					
2.1	Demonstrate Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE) Decontamination in a Field Environment	Given equipment, forms, and required literature demonstrate Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE) patient decontamination in a field environment with no more than one instructor assist.		P2	

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 3: Field Equipment Performance Lab					
3.1	Document a Technical Inspection on a Defibrillator	Given a defibrillator, manufacturer's literature and test equipment, document a technical inspection with no more than one instructor assist.		P2	
3.2	Perform a Preventive Maintenance Inspection, Calibration Verification and Repair any Faults on a Vital Signs Monitoring System	Given a vital signs monitoring system, required forms, manufacturer's literature and test equipment, perform a preventive maintenance inspection and calibration verification, and repair any faults found with no more than one instructor assist.		P2	
3.3	Perform a Preventive Maintenance Inspection, Calibration Verification and Repair any Faults on a Dental X-Ray System	Given an intraoral dental X-ray system, required forms, manufacturer's literature and test equipment perform a preventive maintenance inspection and calibration verification, and repair any faults found with no more than one instructor assist.		P2	
3.4	Perform a Preventive Maintenance Inspection, Calibration Verification and Repair any Faults on a Digital Dental Processor	Given a digital dental processor, required forms, manufacturer's literature and test equipment, perform a preventive maintenance inspection and calibration verification, and repair any faults found with no more than one instructor assist.		P2	
3.5	Perform an Operational Inspection on a Medical Refrigeration System	Given a medical refrigeration system, required forms, manufacturer's literature and test equipment, perform an operational inspection with no more than one instructor assist.		P2	
3.6	Perform a Preventive Maintenance Inspection and Repair any Faults on a Surgical Table.	Given a surgical table, required forms, manufacturer's literature and test equipment, perform a preventive maintenance inspection and repair any faults found with no more than one instructor assist.		P2	

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
3.7	Unpack and Set Up a Table of Organization (TOE) Mobile X-Ray System	Given a table of organization (TOE) mobile X-ray system, required forms, required literature and TMDE, unpack and set-up with no more than one instructor assist.		P2	
3.8	Unpack and Set Up a Table of Organization (TOE) Dental Operating System	Given a table of organization (TOE) dental operating system, required forms, required literature and TMDE, unpack and set-up with no more than one instructor assist.		P2	
Unit 4: Combat Survival Skills					
4.1	Perform Combat Survivor Skills in a Field Training Environment	Given a Field Training Environment, perform Combat Survival Skills with no more than one instructor assist.		P2	
Unit 5: Field Training Exercise (FTX)					
5.1	A Soldier must Demonstrate Military Occupational Specialty (MOS) and Combat Skills in a Simulated Tactical Environment	Given a Field Training Environment, a soldier must demonstrate Military Occupational Specialty (MOS) and Combat Skills in a simulated tactical environment IAW ARTEP 8-705-MTP.		P2	
Unit 6: Army Physical Fitness Test (APFT)					
6.1	APFT	Participate in Army Physical Fitness Test		P1	
Unit 7: Program Feedback and Graduation					
7.1	Program Feedback and Graduation	Participate in Program Feedback and Graduation		P1	

Navy Service Specific

CBMS 101 Computer Based Medical System

Course Description: Attended by Navy students only. Refer to the CBMS Course description located in the CBMS Curriculum Plan. ([Appendix I](#))

TELE 101 Telemedicine

Course Description: Attended by Navy students only. Refer to the TELE Course description located in the TELE Curriculum Plan. ([Appendix J](#))

RFIS 101 Radiographic/Fluoroscopic Imaging Systems

Course Description: Attended by Navy students only. Refer to the RFIS Course description located in the RFIS Curriculum Plan. ([Appendix K](#))

MIS 101 Mammography Imaging Systems

Course Description: Attended by Navy students only. Refer to the MIS Course description located in the MIS Curriculum Plan. ([Appendix L](#))

UIS 101 Ultrasound Imaging Systems

Course Description: Attended by Navy students only. Refer to the UIS Course description located in the UIS Curriculum Plan. ([Appendix M](#))

BMET 112N Navy Service Specific

Course Description: This is the final segment of instruction for Navy students prior to graduating the BMET training program. In this course, students are segregated by Service affiliation for specific training requirements. These requirements are identified as critical by the Service training proponent and not addressed within the core course curriculum. The Navy Service Specific course is designed to train and evaluate Navy students on medical equipment and maintenance management procedures in a hospital, field, or fleet environment. The Navy Service Specific course covers familiarization on the following topics and equipment:

3M via the Shipboard Training Enhancement Program (STEP)
Navy Medical Maintenance Administration

Course Goals: Students will be able to accomplish the following upon completion of the course:

Analyze and comprehend the Navy 3M via the Shipboard Training Enhancement Program (STEP), and Navy Medical Maintenance Administration in a hospital, field, or fleet environment relevant to the role of the biomedical equipment technician

Have the technical proficiency and skills required to comprehend, relate, evaluate, and document results obtained through the use of TMDE in performing maintenance on medical equipment in a hospital, field, or fleet environment

Course Prerequisite(s): UIS 101 Ultrasound Imaging Systems.

Distribution of Contact Hours

Unit #	Unit Title	Did	Demo	Lab/ Prac	Clin	WTest	PTest	Other	Req'd Act.	Total
1	Navy Medical Equipment Management Program	113	6	0	0	0	0	0	0	119
2	Performance Lab	0	0	22	0	0	0	0	0	22
3	Written Test	0	0	0	0	1.5	0	0	0	1.5
4	Program Feedback and Graduation	0	0	1.5	0	0	0	0	0	1.5
	Total	113	6	23.5	0	1.5	0	0	0	144

Course Objectives and Levels of Learning:

Learning Objective #	Lesson Name	Lesson Objective	Level of Learning		
			Cognitive	Psycho-motor	Affective
Unit 1: Navy Medical Equipment Management Program					
1.1	Identify Routine Operational Procedures of a P-5132.	Given a P-5132, identify routine operational procedures with at least 70% accuracy.	C2		
1.2	Identify Required Routine Operational Procedures of the Maintenance and Material Management (3M) Software System	Given the Maintenance and Material Management (3M) software system, identify required routine operational procedures with at least 70% accuracy.	C2		
1.3	Identify Basic Facts and Terms Relating to Required Routine Operational Procedures of the Fleet Marine Force Medical Maintenance Management Software System	Given the Fleet Marine Force medical maintenance management software system, identify basic facts and terms relating to required routine operational procedures with at least 70 percent accuracy.	C2		
Unit 2: Performance Lab					
2.1	Process a Scheduled and Unscheduled Workorder	Given a scenario and using DMLSS, process a scheduled and unscheduled workorder without instructor assist.		P2	
2.2	Process an Acceptance Inspection Workorder	Given a medical device and using DMLSS, process an acceptance inspection workorder without instructor assist.		P2	
Unit 3: Written Test - Navy Service Specific					
Unit 4: Program Feedback and Graduation					
4.1	Program Feedback and Graduation	Participate in Program Feedback and Graduation		P1	