

# Dakota County Technical College

## **BMET 1111: Medical Device Technology**

### **A. COURSE DESCRIPTION**

Credits: 3

Lecture Hours/Week: 3

Lab Hours/Week: \*.\*

OJT Hours/Week: \*.\*

Prerequisites: None

Corequisites: None

MnTC Goals: None

This course provides students with an industry overview/perspective of the biomedical technology field. In this course students will learn the relationships between equipment and patient care and the various sensors and transducers used by medical equipment. Typical electronic circuitry used in medical equipment will be covered. Prerequisites: None.

**B. COURSE EFFECTIVE DATES:** 08/27/2012 - Present

**C. OUTLINE OF MAJOR CONTENT AREAS**

**D. LEARNING OUTCOMES (General)**

1. Describe body systems and functions
2. Describe blood flow dynamics
3. Explain generation and propagation of bioelectric potentials
4. Detail the internal electroconduction system of the human heart
5. Define accuracy, precision, resolution, reliability and validity of measurements
6. Identify signals and noise
7. Identify electrodes used to acquire biopotentials
8. Describe types of transducers used to measure physiological parameters
9. State the requirements and operation of a bioelectric amplifier
10. Draw bioelectric amplifier configurations
11. Describe an electrocardiograph (ECG recording)
12. List causes and cures for common ECG recording malfunctions
13. Describe how pressure is measured
14. Operate defibrillators and cardioverters
15. Measure pulmonary function
16. Describe the physiological basis for respiratory therapy
17. Describe procedures and equipment used in oxygen therapy
18. Describe instrumentation for measuring anatomical and physiological parameters of the brain
19. Analyze origin, location, amplitude and frequency of EEG signals
20. Understand variation and its effect on measurement
21. Recognize and use significant figures
22. Understand and use decibel notation in systems and signal calculations
23. Use scientific notation
24. Explain mean, median, mode, harmonic average, root mean square and root sum of squares
25. Define standard deviation and variance in measurement data
26. List categories of measurement
27. Define accuracy, precision, resolution, reliability and validity
28. Evaluate the role and nature of error
29. Minimize measurement error
30. List and describe classes of signals
31. Describe the Fourier series of waveforms
32. Describe the relationship of noise and signals
33. Describe noise factor, noise figure and noise temperature
34. Describe Wheatstone bridge principle
35. Understand the biological principles underlying the respiratory system
36. List and describe the gas laws (Boyle's, Charles', Dalton's & Henry's)
37. Describe cellular respiration
38. Describe pulmonary respiration
39. List and describe mechanics and parameters of respiration
40. Describe respiratory regulation
41. List and describe unbalanced and diseased states
42. List environmental threats to the respiratory system
43. Operate respiratory transducers
44. Operate instruments used in respiratory system measurement

45. List respiratory diseases that require artificial respiratory therapy
46. Operate equipment used in mechanical ventilation
47. Operate equipment used in intermittent positive pressure therapy
48. List regulatory agencies involved in compressed gas safety
49. Describe sterilization and isolation procedures in RT units
50. List faults and maintenance procedures for artificial respiratory ventilators

**E. Minnesota Transfer Curriculum Goal Area(s) and Competencies**

None

**F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

**G. SPECIAL INFORMATION**

None noted