

**COURSE OUTLINE**  
**BMET-212**  
**Biomedical Instrumentation II**  
**5 Credits**

**HOWARD COMMUNITY COLLEGE**

**Description**

In this theoretical-practical course, the student will utilize electronic and mechanical principles for maintenance and repair of biomedical equipment (electro-mechanical, clinical lab, ultrasonics, patient monitoring, x-ray and radiation). Students will be in a simulated clinical setting where they will perform on-site repairs and preventative maintenance. Prerequisite: BMET-211. (4 hours lecture, 3 hours lab)

**Overall Course Objectives**

Upon completion of this course, the student will be able to:

1. Use proper management tools to accomplish tasks that are essential to department certification.
2. Demonstrate how individual pieces of instrumentation are combined to form systems throughout the hospital.
3. Describe the operating principals of biomedical instrumentation systems in the hospital.
4. Formulate the ethics required when performing in the patient care environment.
5. Understand physiological functions being monitored or duplicated.
6. Use the specify tests to check out instrumentation against manufacturers recommended specifications.
7. Perform preventative maintenance and repairs on various biomedical instrumentation systems encountered in the hospital setting.
8. Interface the various biomedical systems correctly in terms of information correctness and safety.
9. Apply the basic operating principles of non-electronic devices incorporating fluidic or pneumatic principles to accomplish biomedical functions.
10. Use terminology when relating to either anatomical or equipment functions.
11. Discuss the operation of various D/A and A/D converters currently in use with today's technology.
12. Expand new technologies into current theories such as cat scan, MRI, linear accelerators and pet units.
13. Determine the closed loop environment currently employed and measure various systems such as air flows, hazardous components, pressures and laws governing the environment.
14. Interface with other professionals to ensure proper operating procedures.
15. Operate various biomedical instrumentation calibrations devices used as standards such as ECG, respiration, renal and neurological simulators.
16. Perform in highly hazardous situations and be cognizant of potential future problems.

**Major Topics**

- I. Physiological Systems Other than the Circulatory System
  - A. Respiratory/Renal/Nervous System and Other Biological Parameters Involving Biomedical Instrumentation

- II. Biomedical Instrumentation
  - A. Respiratory Functions/Transducer's
  - B. Renal System and Equipment used to Duplicate Renal Functions
  - C. Nervous/Muscle/Skeletal System and Electronic Equipment Simulating or Stimulating Neurological Outputs
  - D. Lab Equipment and Standards Used to Ensure Proper Operation and Accuracy of these Results
  - E. Basic Life Support Systems of the Premature/Pediatric/Labor Delivery Suites/Calibration/Special Functions
- III. General Instrumentation
  - A. Test Equipment used to Measure or Duplicate Biopotential Outputs
- IV. Regulatory Agencies and the Role Performed
  - A. OSHA
  - B. NIOSH
  - C. FDA
  - D. CDC
- V. Ultrasound/X-Ray Systems Operation and Hazards Encountered with Operation of these Devices

### **Course Requirements**

Application of theoretical content to actual patient care equipment systems both in college labs and various hospitals (on the job work experience).

Grading/exams: Grading procedures will be determined by the individual faculty member(s) but will include the following:

- Final grades will be based on exams and lab requirements.
- This course includes a comprehensive final test.

Writing: Specific writing assignments will be determined by the individual faculty member.

### **Other Course Information**

This course is a course in the Biomedical Engineering Technology Program.