



APPROVED COURSE OUTLINE

Credit(s) 1.00
Contact Hours 32.00
Effective Term: Fall 2015 (505)

EET 1214C

Instrumentation and Control Systems Engineering and Building Arts Department

Requisites:

Prerequisite: EET 1084C with a minimum grade of C
and

Admission to: BMET-AS Requires interview with program director and program application.

Course Description:

This course introduces the student to the basic lab instruments for testing and troubleshooting electrical components. The topics covered will include the principle of operation and usage of digital multi-meters, portable oscilloscopes, simulators and other testing equipment needed to perform testing and calibration of medical devices.

Course Topics:

- None

Learning Outcomes and Objectives:

1. Students will demonstrate competency in performing core skills needed for mathematical functions, scientific notations, logarithms, measurements and graphing by:

- a. performing required mathematical functions.
- b. performing numerical conversions between standard and scientific notations.
- c. performing calculations of logarithms and antilogarithms.
- d. performing conversions of units of measure within the metric system and between metric and US systems.
- e. applying appropriate graphing methods to data.

2. The student will demonstrate proficiency in troubleshooting basic electrical systems, use of test equipment, processes and electrical safety by:

- a. demonstrating principle of operation and usage of digital multi-meters, oscilloscope, function and pulse generators.
- b. identifying current ranges for AC and DC circuits and related testing procedures.
- c. identifying and using appropriate equipment and processes to test, and troubleshoot multi-chip logic circuits.
- d. researching and identifying micro-voltage related patient safety issues for medical devices.

3. The student will demonstrate proficiency in operating test equipment, repairing basic electrical systems and resolving patient safety issues by:

- a. choosing the correct piece of electronic equipment needed to test parameters of biomedical devices.
- b. identifying common problems and solutions used for troubleshooting biomedical devices.
- c. researching, identifying and using specialized medical device analyzers to troubleshoot and resolve identified system related problems.

4. The student will demonstrate proficiency in electrical measurement, test equipment use, device troubleshooting and operation of patient simulation devices by:

- a. identifying biomedical device parameters for voltage, current, and resistance and measure using the appropriate piece of electronic testing equipment.
- b. determine different frequencies and waveforms using function generators
- c. identifying the functions and measurement features of patient simulation devices.
- d. selecting and using patient simulation devices to troubleshoot assigned biomedical devices and document device problems and patient safety issues.

Criteria Performance Standard:

Upon successful completion of the course the student will, with a minimum of 70% accuracy, demonstrate mastery of each of the above stated objectives through classroom measures developed by individual course instructors.

Representative Textbooks:

• Textbook(s):

1. **Supplemental** - Prince, Jerry. *Medical Imaging Signals and Systems*, 2nd ed. Prentice Hall, 2005
2. **Supplemental** - Villafane, Carlos. *Biomed: From the Student Perspective*, ed. Techniciansfriend.com, 2009
3. **Supplemental** - Anandanatarajan, R. *Biomedical Instrumentation And Measurements*, 1st ed. PHI Learning Private Limited, 2010

Relevant Dates:

C&I Approval: , BOT Approval: , Effective Term: Fall 2015 (505)

History of Changes:

C&I Approval: , BOT Approval: , Effective Term: Fall 2015 (505)

Related Programs:

1. Engineering Technology Associate in Science (ENG-AS) (505) (Active)
2. Engineering Technology Associate in Science (ENG-AS) (520) (Pending)

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