

**LAST REVIEW:** 2009-2010  
*(i.e. 2003-2004)*

**NEXT REVIEW:** 2014-2015  
*(i.e. 2008-2009)*

**STATUS:** A  
*(A, I, D)*

**COURSE TITLE:** Biomedical Engineering Technology Internship

**COMMON COURSE NUMBER:** EST 2940

**CREDIT HOURS:** 4.0

**CONTACT HOUR BREAKDOWN**  
*(per 16 week term)*

**CLOCK HOURS:**  
*(Voc. Course ONLY)*

Lecture:

Lab:

Clinic:

Other: 312

**PREREQUISITE(S):** EET 2142C, HSC 1531, MEA 1253, CET 2131C, CHM 1033

**COREQUISITE(S):** None

**PRE/COREQUISITE(S):**

**COURSE DESCRIPTION** *(750 characters, maximum):*

The student will participate in a 13-week internship, 24 hours per week at a cooperating hospital. Topics will include orientation to biomedical engineering, medical instrumentation theory, safety standards, “hands-on” preventive maintenance procedures and equipment repair activities. The hospital biomedical engineering staff will directly supervise all aspects of the course.

General Education Requirements – Associate of Arts Degree (AA), meets Area(s): Area  
General Education Requirements – Associate in Science Degree (AS), meets Area(s): Area  
General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s): Area

## **UNIT TITLES**

1. Orientation to the Biomedical Engineering Department and the hospital.
2. Review of medical terminology, anatomy and physiology, and biophysical signal origins acquisition.
3. Introduction to the purpose and application of medical electronic instrumentation and equipment.
4. Introduction to electrical safety codes, regulations and testing procedures used in hospitals per N.F.P.A. #99 (health care facilities).
5. Training on specialized biomedical test equipment and review of general electronic test equipment.
6. Training on the policies and procedures for medical equipment preventative maintenance.
7. Training to utilize a biomedical maintenance program database.
8. Familiarization with activities to support medical equipment repair.
9. Exposure to management issues in Biomedical Engineering.

## **EVALUATION:**

Please provide a brief description (250 characters maximum) that details how students will be evaluated on the course outcomes.

Students will be evaluated by certain criteria such as Analytical skills/problem solving abilities, Communicative skills, and others such as Learning ability, Quality of work, and etc., which are specified on the evaluation sheet that is filled out by the supervisor of the sponsored organization.

**Common Course Number: EST 2940**

## **UNITS**

### **Unit 1: Orientation to the Biomedical Engineering Department and the hospital**

#### **General Outcome:**

- 1.0 The student shall: be able to describe the function of a Biomedical Engineering Department and the expectations of a biomedical equipment technician.**

#### **Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 1.1 List the operational objectives of the Biomedical Engineering Department.**
- 1.2 List the clinical areas of responsibility**
- 1.3 List the technologies that the Biomedical Engineering Department is responsible to manage.**
- 1.4 List the job responsibilities of a BMET.**

**Common Course Number: EST 2940**

**Unit 2: Review of medical terminology, anatomy and physiology, and biophysical signal origins and acquisition.**

**General Outcome:**

**2.0 The student shall: be able to describe pertinent medical terms, anatomical structures, physiological phenomena, and two biophysical signals are produced and detected.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 2.1 Give definitions of medical terms as related to Biomedical Engineering.**
- 2.2 List the origins and methods of detection of biophysical signals.**

**Common Course Number:** EST 2940

**Unit 3:** Introduction to the purpose and application of medical electronics instrumentation and equipment.

**General Outcome:**

**3.0** The student shall: be able to justify the use of medical electronic equipment and demonstrate knowledge of its use.

**Specific Measurable Learning Outcomes:**

Upon successful completion of this unit, the student shall be able to:

- 3.1** Distinguish between the classes of medical equipment, from general to intermediate to critical.
- 3.2** Demonstrate an understanding of the use, operation, and patient to equipment interfaces of medical electronic instrumentation.

**Common Course Number:** EST 2940

**Unit 4:** Introduction to electrical safety codes, regulations, and testing procedures used within health-care facilities per N.F.P.A. #99.

**General Outcome:**

- 4.0 The student shall:** The students should be able to demonstrate an understanding of life safety codes, regulations, and testing procedures required to be conducted in health-care facilities by governing bodies such as N.F.P.A. and J.C.A.H.O.

**Specific Measurable Learning Outcomes:**

Upon successful completion of this unit, the student shall be able to:

- 4.1 List the major components of the electrical safety codes per N.F.P.A. #99.**
- 4.2 Demonstrate an ability to test for code compliance per N.F.P.A. #99.**

**Common Course Number: EST 2940**

**Unit 5: Training on specialized biomedical test equipment and review of general electronics test equipment.**

**General Outcome:**

**5.0 The student shall: be able to demonstrate proficiency in the utilization of specialized biomedical test equipment and general electronics test equipment.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 5.1 Differentiate between the types of biomedical test equipment.**
- 5.2 Demonstrate the ability to use biomedical test equipment and general electronics test equipment.**
- 5.3 Describe the care and handling of all test equipment.**

**Common Course Number:** EST 2940

**Unit 6:** Training on the policies and procedures for medical equipment preventative maintenance.

**General Outcome:**

- 6.0 The student shall: be able to demonstrate preventative maintenance procedures on medical equipment to determine its compliance with applicable codes, and manufacturers recommended specifications.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 6.1 Demonstrate an ability to perform an appropriate preventative maintenance on different classes of medical equipment.**
- 6.2 Determine if medical equipment is in compliance with all applicable regulations and policies.**
- 6.3 Demonstrate what actions are necessary when a violation of codes, regulations, or policies is detected.**
- 6.4 Demonstrate the ability to properly document the preventative maintenance activities.**

**Common Course Number:** EST 2940

**Unit 7:** Training to utilize a biomedical maintenance program database.

**General Outcome:**

**7.0 The student shall: be able to demonstrate proficiency with computer programs, and databases specific to biomedical engineering and general use.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 7.1 Demonstrate the ability to input data into the biomedical database.**
- 7.2 Demonstrate the ability to search and locate files in the biomedical database.**
- 7.3 Demonstrate the ability for report generation using the biomedical database and other general use databases.**

**Common Course Number: EST 2940**

**Unit 8: Familiarization with activities to support medical equipment repair.**

**General Outcome:**

- 8.0 The student shall: be able to demonstrate an ability for well conceived and logical trouble-shooting plans and the ability to follow through and verify equipment and circuit operations.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 8.1 Explain simple and complex circuits.**
- 8.2 Determine the operational state of circuits.**
- 8.3 Compile a logical trouble-shooting plan.**
- 8.4 Successfully resolve equipment malfunctions.**
- 8.5 Properly document activities.**

**Common Course Number:** EST 2940

**Unit 9:** Exposure to management issues in Biomedical Engineering.

**General Outcome:**

- 9.0** The student shall: be able to demonstrate an understanding of the various management issues used to justify and support the activities of the department.

**Specific Measurable Learning Outcomes:**

Upon successful completion of this unit, the student shall be able to:

- 9.1** Plan a workable Biomedical Engineering Department.
- 9.2** Defend and justify the plan.
- 9.3** Demonstrate an understanding of human relations.
- 9.4** Present a report to the department.
- 9.5** Plan an assign work activities for the department.
- 9.6** Interface with other hospital departments.