

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE
ACADEMIC AFFAIRS

Course Number: BMT-101 Class/Lect. Hours: _____ Lab Hours: _____ Credits: 3 Dept.: _____

Course Title: Introduction to Biomedical Devices and Industry Semester: _____ Year: _____

Course Description, Prerequisite, Corequisite:

This course introduces students to the conceptual clinical engineering department in a hospital. Students learn the organization of the hospital and the operation of the clinical engineering department. Students are introduced to the professional requirements of performing their tasks in the administrative and patient care environments of a hospital or related health care facility. An introductory set of instrument technologies and test and maintenance equipment are explored as well as the underlying sensor and transducer technologies.

| Course Objectives | Competencies |
|---|---|
| <ol style="list-style-type: none"> 1. To survey and gain an introductory understanding the biomedical device industry. 2. To become familiar with the organization and operation of typical biomedical departments in various medical institutions including hospitals medical clinics, etc. 3. To be able to enumerate and understand various roles in biomedical manufacturing, biomedical services, and biomedical laboratory research. 4. To understand the purpose, design, and performance of a selected set of commonly used biomedical instruments. | <ul style="list-style-type: none"> • Medical Practice Related <ul style="list-style-type: none"> ○ Students will know the high-level organization of hospitals including the major departments and the major patient care environments. ○ Students will understand the organization and admionstration of the clinical engineering department. ○ Students will know introductory safety rules, regulations, and practices of a typical clinical engineering department. ○ Students will be able to inquire, understand and follow established testing standards ○ Students will be able to work with technicians ○ Students will be able to participate and work on teams ○ Students will be able to use quality customer skills when working with clinical staff, physicians, patients, visitors and all others ○ Students will participate in presentations by medical device suppliers ○ Students should be able to investigate education and training schedule of the clinical engineering department ○ Students will be able to use an electrical safety analyzer for electrical safety measurements ○ Students will be able to use various required analyzers and simulators to test, calibrate and service medical equipment and systems ○ Students will be able to understand the clinical engineering department hazard alert policies and procedures • Systems and Instruments <ul style="list-style-type: none"> ○ Students will be able to use a physiological simulator (ECG, blood |

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|-------------------|---|
| | <ul style="list-style-type: none"> ○ pressure, temperature) ○ Students will be able to use a non-invasive blood pressure simulator ○ Students will be able to use a pressure meter ○ Students will be able to use a defibrillator analyzer ○ Students will be able to use a pulse oximeter analyzer ○ Students will be able to use an infusion pump analyzer ○ Students will be able to use digital multimeters and oscilloscopes ○ Students will present well written engineering reports on various medical devices • Students will understand the basic functions of the human body: <ul style="list-style-type: none"> ○ Blood (composition and pH) ○ Circulatory system ○ Heart chambers and valves ○ Cardiac physiology ○ Bio-potentials ○ Electro-conduction system of the heart ○ Lungs • Students will be able to perform basic preventive maintenance tests and have a basic functional knowledge of the following medical devices: <ul style="list-style-type: none"> ○ Electrocardiographs ○ Bedside physiologic monitors - ECG, BP, Temp, CO, NIBP, etc. ○ Non-invasive blood pressure monitors ○ Defibrillators ○ Pacemakers (external invasive and non-invasive) ○ Pulse Oximeters ○ Incubators ○ Radiant warmers ○ Fetal monitors ○ Ventilators ○ Infusion devices (IV pumps, PCA, feeding) ○ Respiratory therapy equipment (O2 analyzers, spirometers, nebulizers) ○ Suction equipment (battery and wall powered) ○ Electric beds ○ Examining lights • Students will have a basic knowledge of the sensor and transducer technologies involved in the aforementioned instruments. <ul style="list-style-type: none"> ○ e.g. Transducers (blood pressure) ○ temperature sensors ○ plesmyography ○ visible and infrared light sensing (e.g. pulse oximeters). ○ biopotentials |