

FLORIDA STATE COLLEGE AT JACKSONVILLE

COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER: EST 1412

COURSE TITLE: Biomedical Technology and Techniques

PREREQUISITE(S): EET 1035

COREQUISITE(S): None

CREDIT HOURS: 3

CONTACT HOURS/WEEK: 3

CONTACT HOUR BREAKDOWN:

Lecture/Discussion: 3

Laboratory:

Other _____:

FACULTY WORKLOAD POINTS: 3

STANDARDIZED CLASS SIZE ALLOCATION: 12

CATALOG COURSE DESCRIPTION:

This course, designed to introduce the students to the hospital, biomedical equipment manufacturers and the contract maintenance organizations, emphasizes the organizational structure of the hospital and identifies the role of the BMET within this framework. The course will also introduce students to the literature in professional journals covering facets of the BMET's job, with particular emphasis on instrument critiques, electrical safety standards, and new products. Finally the course will utilize a system approach in analyzing how technology is applied in the health care setting, from the medical and administrative management viewpoints. Systems analyzed will include intensive care unit, cardiovascular diagnostic laboratory and the operating rooms.

SUGGESTED TEXT(S): Cook, A.M. and Webster, J.G. Editors. Clinical Engineering: Principles and Practices, New Jersey Prentice-Hall Inc, 1979.

IMPLEMENTATION DATE: June 25, 1984

REVIEW OR MODIFICATION DATE: Fall Term, 1994 (951)
Fall Term, 1997 (981)
Fall Term, 2002 (20031)
Fall Term, 2003 (20041)

COURSE TOPICS	CONTACT HOURS <u>PER TOPIC</u>
I. Overview of BMET Training	3
A. Electronics Courses	
B. Physics, Anatomy and Physiology	
C. Mathematics	
D. Instrumentation Courses	
E. Practical Courses	
1. Safety and Terminology	
2. Technology and Health Care Delivery	
F. Humanities	
II. Hospital Organization	3
A. Major Hospital Departments and their Functions	
1. Clinical Laboratory	
2. Intensive Care Unit	
3. Operating Room	
4. Patients Rooms	
B. Kinds of Equipment Typically Found in Each Department for a Small Hospital (Under 100 Beds)	
C. Kinds of Equipment Typically Found in Each Department for Hospitals Over 100 Beds	
D. The Role of the BMET in the Field	
1. Preventive Maintenance and Maintenance Scheduling	
2. Safety Inspection	
3. Equipment Repair	
4. Reading of Equipment Specifications to Advise Purchasing Department	
5. Conducting Inservice Training for Professional and Paramedical Staff	
6. Inventory Control of Repair Parts	
E. Methods of Obtaining Employment in Hospitals	
1. Employment Services	
2. Personal Contact	
3. Through Work Study Schemes Arranged by the Participating School	

COURSE TOPICS (CONTINUED)

CONTACT HOURS
PER TOPIC

<p>III. Industry and Repair Contract Organizations</p> <p>A. Major Manufacturers of Biomedical Equipment</p> <ol style="list-style-type: none"> 1. Departmental Structure 2. Sales Organizations 3. Repair Organizations <p>B. Jobs Performed by BMETs for Major Manufacturers</p> <ol style="list-style-type: none"> 1. Entry Level Tasks (Bench work) 2. Sales 3. Repair (Field Service) 4. Career Ladder Possibilities and Job Security <p>C. Service Contract Organizations</p> <ol style="list-style-type: none"> 1. Small Repair Business 2. Shared Services Organizations <p>D. Jobs performed by BMETs for Service Contract Organizations</p> <ol style="list-style-type: none"> 1. Preventive Maintenance 2. Safety Surveillance 3. Repair of Non-Factory Warranty Equipment 4. Repair of Equipment for Companies as their Service Representatives 	<p>3</p>
<p>IV. Regulatory Agencies</p> <p>A. Names and Functions of Agencies as they Affect BMETs</p> <ol style="list-style-type: none"> 1. Association for Advancement of Medical Instrumentation 2. Occupational Safety and Health Administration 3. American Medical Association 4. American Hospital Association 5. National Health Service 6. Joint Commission for Accreditation of Hospitals 7. State Department of Public Health <p>B. Certification Programs for BMETs</p>	<p>3</p>
<p>V. Introduction to Professional Journals</p> <p>A. Kinds of Journals Available</p> <p>B. Sources for Obtaining Journals</p> <p>C. Specifically Useful Sections of Journals</p> <p>D. Methods of Reading Journals Critically</p>	<p>3</p>

COURSE TOPICS (CONTINUED)	CONTACT HOURS <u>PER TOPIC</u>
VI. New Device Evaluation/Instrument Critiques A. Evaluation Criteria B. Test Methods C. Performance/Cost Tradeoffs	3
VII. Health Care System Design: Intensive Care Unit Overview A. Case study - ICU Design B. System Layout C. Staffing D. Administrative Considerations	3
VIII. ICU II - Medical Aspects of Design A. Types of Medical Care Delivered B. Cardiovascular Therapy C. Respiratory Therapy D. Other Therapy	3
IX. ICU II- Patient Care Equipment System Design A. Central Station Devices B. Bedside Monitoring C. Portable Devices D. Room/systems Design	3
X. Health Care System Design: Cardiovascular Diagnostic Laboratory (CDL) I-Overview A. Case Study B. System Layout C. Staffing D. Administrative Considerations	3
XI. CDL II-Medical Aspects of Design A. Types of Medical Care Delivered B. Catheterization C. Stress Testing D. Other Diagnostic Modalities	3

COURSE TOPICS (CONTINUED)	CONTACT HOURS <u>PER TOPIC</u>
XII. CDL III-Patient Care Equipment System Design A. Catheterization Labs B. Patient Holding Areas C. ECG/Stress Test Analysis D. Ultrasonic Devices for Diagnosis E. Other Diagnostic Tools	3
XIII. Health Care System Design: Operating Rooms I- Overview A. Case Study - OR Design B. System Layout C. Staffing D. Administrative Considerations	3
XIV. OR II-Medical Aspects of Design A. Types of Medical Care Delivered B. Anesthesia C. Surgical Techniques D. Treatment of Surgical Diseases	3
XV. OR III - Patient Care Equipment Design A. Vital Signs Monitoring B. Surgical Instrumentation C. Anesthesia Devices D. Other Unique Surgical Devices	3

PROGRAM TITLE: Biomedical Engineering Technology
 COURSE TITLE: Biomedical Technology and Techniques
 CIP NUMBER: 0615040101

LIST PERFORMANCE STANDARD ADDRESSED:

NUMBER(S): TITLES(S):

10.0 DEMONSTRATE AN UNDERSTANDING OF THEORY OF OPTICAL SYSTEMS FOR BIOMEDICAL

APPLICATIONS--The student will be able to:

- 10.01 Analyze an optical system for a biomedical application.
- 10.04 Analyze a laser system for a biomedical application.
- 10.07 Describe an optical system as it applies to the biomedical field.

11.0 DEMONSTRATE AN UNDERSTANDING OF THEORY OF BIOMEDICAL MONITORING EQUIPMENT--The

student will be able to:

- 11.01 Demonstrate an understanding of the theory of audio cardiac monitoring equipment.
- 11.02 Demonstrate an understanding of the theory of visual cardiac monitoring equipment.
- 11.03 Demonstrate an understanding of the theory of mechanical cardiac monitoring and recording equipment.
- 11.04 Demonstrate an understanding of the theory of visual and mechanical blood pressure monitoring equipment.
- 11.05 Demonstrate an understanding of the theory of fetal monitoring equipment.
- 11.06 Demonstrate an understanding of the theory for instrumentation used in monitoring brain activity.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 15.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 15.03 Read and follow written and oral instructions.
- 15.04 Answer and ask questions coherently and concisely.
- 15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 16.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 16.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 16.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

LIST PERFORMANCE STANDARD ADDRESSED: (CONTINUED)

NUMBER(S): TITLES(S):

16.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

16.05 Demonstrate an understanding of federal, state and local taxes and their computation.

17.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

17.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

17.02 Draw conclusions or make inferences from data.

17.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

17.04 Understand pressure measurement in terms of P.S.I., inches of mercury and K.P.A.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.

18.02 Secure information about a job.

18.03 Identify documents which may be required when applying for a job interview.

18.04 Complete a job application form correctly.

18.05 Demonstrate competence in job interview techniques.

18.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

18.07 Identify acceptable work habits.

18.08 Demonstrate knowledge of how to make appropriate job changes.

18.09 Demonstrate acceptable employee health habits.

18.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

19.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

19.01 Identify characteristics of the American enterprise system.

19.02 Define inflation and deflation.

19.03 Illustrate the basic economic questions facing any society.

19.04 Determine the results of a change in demand or a change in supply.

19.05 List factors which contribute to economic growth.

19.06 Identify characteristics of different types of business ownership.

19.07 Choose appropriate action in a situation requiring application of business ethics.