Training Issues for Biomedical Equipment Technicians and Clinical Engineers
Part 2

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Scott Segalewitz, PE
Alyson Whitmore, CBET

July 15, 2003
Faculty

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North Little Rock, AR

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Engineering Technology
University of Dayton
Dayton, OH

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UAMS Medical Center
Little Rock, AR
Training Issues for Biomedical Equipment Technicians and Clinical Engineers

Because the number of education institutions offering BMET/CE programs is dwindling, there is a need for alternative approaches to training in order to keep the field going.
The Problem

Associate Degree Programs (US)

Current Accredited BET Programs

- Chattahoochee Technical Institute
  Biomedical Engineering Technology (AAT) [1999] Marietta, GA

- Cincinnati State Technical and Community College
  Biomedical Electronic(s) Engineering Technology (AS) [1988] Cincinnati, OH

- Gateway Community College
  Biomedical Engineering Technology (AS) [1996] North Haven, CT

- Pennsylvania State University, New Kensington Campus
  Biomedical Equipment Technology (AS) [1985] New Kensington, PA

- Southwest Tennessee Community College
  Biomedical Engineering Technology (AS) [1976] Memphis, TN

Source: www.abet.org
BMET Program Highlights

• **Associate Degree**
  – Cincinnati State Technical & Community College
  – Penn State University, New Kensington

• **Baccalaureate Degree**
  – British Columbia Institute of Technology

• **Training**
  – Capital Medical Division (UK)
  – DITEC (OH)
  – Hennepin County Medical Center (MN)
  – International Union of Operating Engineers – Local 39 (CA)

• **Self-Study**
  – Scientific Enterprises
Cincinnati State Technical & Community College

Name & curriculum change from

Biomedical Electronics Engineering Technology

to

Biomedical Equipment and Information Systems Technology

www.cinstate.cc.oh.us/
### CSTCC Biomedical Equipment & Information Systems Major

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<th>Course</th>
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Penn State New Kensington

- **Fall Guest Lecture Series (suppliers)**
  - Granger, Graybar, Leff Electronics, Cuttler Hammer, AmeriNet Central, Levington, Praxair, Hubbell, etc.

- **Spring Guest Lecture Series (clinical/operations)**

www.nk.psu.edu/bet/
Penn State New Kensington

- Active/encouraged participation in local (HESP) and national (ASHE) professional organizations.
- Radiation Physics course
  - BET & RadTech Students
- Undergraduate research class
PSNK Research Methods

Battery type - Energizer Lithium       Telemetry type - Philips-Agilent

Battery Voltage
Warning Voltage
Cut-Off Voltage

0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

Time (Hrs)

Current draw 11.28 ma
Weak signal 7.0 Volts
Replace at 6.6 Volts

Battery type - Energizer E2       Telemetry type - Philips-Agilent

Battery Voltage
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Cut-Off Voltage

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British Columbia Institute of Technology (BCIT)

www.health.bcit.ca/biomed/program.htm
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Medical Technology Management Practice

Six Modules

– Overview of Med Tech Mgmt Concepts
– Introduction to Technology Life Cycle
– Technology Maintenance
– Risk Management and Quality Assurance
– Technology Assessment and Acquisition
– Technology Disposal
Medical Technology Management Practice

- Distance Education
- 12 Week Duration
- Online Web-based Delivery using “WebCT”
Module Structure

- Overview of Module
- List of Sub-Modules
- Sub-Modules
- Module Summary
- Review Questions
- Answers to Review Questions

Sub-Module #N
- Learning Objectives
  - List of objectives
- Learning Activities
  - Reading
  - Internet Links
  - Assignments/Case Studies/Projects
Student Demographics

By Geographical Location

- Ont. 21%
- B.C. 32%
- S.Africa 5%
- U.S. 21%
- Other Province 21%

No. of Students
2000 – 6
2001 - 13
Capital Medical Division

“We have recently launched the UK’s first dedicated medical engineering training centre with the objective of becoming the National Centre of Excellence, leading the way in delivering principles based practical training for clinical technologists and medical engineers.”

“Based in an operational hospital, the training centre replicates the working environment and conditions that will be experienced by prospective engineers.”

www.cap-medical.co.uk
Capital Medical Division

Available Modules

- Clinical Technology - An Introduction (5 days)
- Physiological Monitoring Equipment and Infusion Devices (5 days)
- Theatre and Therapeutic Equipment (5 days)
- Dental Equipment (5 days)
- Anesthetic Equipment (10 days)
- X-Ray Equipment (10 days)
- Laboratory Equipment (5 days)

www.cap-medical.co.uk
DITEC

- Introduction to Medical Equipment Maintenance (4-day)
- Fundamentals of Servicing Laboratory Equipment (5-day)

www.ditecnet.com
Hennepin County Medical Center

- Bioelectronics Department (10 techs)
  - Training for EET grads
    - Screening exam
    - Hired as Bioelectronics Specialist (probation)
    - Intensive on the job training (6 month)
      - OR, ICU, Assisted floor call, repairs, etc.
    - Repeat screening exam @ 2 months (w/notes)
    - Repeat screening exam @ 4 months (w/o notes)
      - 90% required before completing probationary period
    - 3-1/2 to 4-1/2 years of additional training

www.hcmc.org
I.U.O.E – Local 39

Apprenticeship Program (4-year)
- On the job training
- Community College classes
  - Electronics, physiology, chemistry, etc.
- Union classes
  - Introduction to Biomedical Equipment Technology (2 semesters)
  - HVAC, others

www.local39training.org/
Scientific Enterprises, Inc

- Biomedical self study courses
- Electronics self study courses
- General self study courses
- Hospital engineering courses
- Safety self study courses

www.scientificenterprises.com
Conclusions

- The demand for biomedical technicians is increasing while the supply is decreasing.
- Innovative education & training programs will be required to meet the demand.
- Increased awareness of the field is necessary to recruit future technical professionals.
- Professional organizations will need to market the BMET profession to prospective technicians & the general public.
Questions?
THANK YOU FOR ATTENDING!