Health Career Directory

Biomedical Engineering Technologist

Overview

Biomedical engineering technologists (BMETs) are medical technology specialists trained to support, maintain, and repair medical devices and systems. These medical devices and systems are used by doctors, nurses, and other medical personnel to monitor, diagnose and treat medical conditions.

Main Roles

Biomedical engineering technologists inspect, maintain, repair, and sometimes install biomedical equipment ranging from devices such as:

- portable and bed-side patient monitors
- kidney dialysis machines
- blood warmers
- ventilators
- thermometers
- defibrillators
- infusion devices
- ultrasound units
- laser equipment
- electrosurgical equipment
- surgical video systems
- infant incubators
- anesthesia machines
- electrosurgical units
- heart-lung machines.

To systems such as:

- CT scanners
- angiography systems
- hemodynamic monitoring systems
- diagnostic laboratory systems
- water purification systems for hemodialysis.

This equipment must be regularly checked and maintained to guarantee the safety of patients and staff. Scheduled preventative maintenance also helps to identify possible problems, save costly repairs, mitigate downtime, and keep hospitals in good standing with national

accreditation bodies. Biomedical engineering technologists keep records of work done on medical devices until such time the devices are retired from service.

When a device is not working well, biomedical engineering technologists act as the link between clinical users and the technology. If there is a problem with a device, a biomedical engineer will ask questions about both the issue and the context, to understand the risk of keeping the device in clinical use. They will also assess the chance of another problem and then consider a strategy to prevent interruption of patient care and reoccurrence. For more serious and time-consuming repairs, devices may be taken out of service for extensive troubleshooting.

This may involve:

- taking apart the device
- repairing or replacing components or circuit boards
- calibrating the device
- sending out the device to manufacturer
- coordinating a loan of a device
- recommending replacement
- reporting an event or complaint to a regulatory body.

When buying medical devices, biomedical engineering technologists may either draft or provide advice regarding equipment specifications and the evaluation of proposed equipment and facility designs.

When new equipment arrives, or existing equipment is improved, biomedical engineering technologists may:

- install the new equipment or parts
- check to ensure that the installation work performed by others has been done properly
- modify equipment to meet unique operational or research needs
- teach hospital staff and researchers how to use equipment.

Much of a biomedical engineering technologist's work involves assessing equipment requirements in consultation with physicians, administrators, engineers, and other professionals. Improvements in information technology are changing the nature of biomedical equipment. To keep up with technological advancements, biomedical engineering technologists must spend a considerable amount of time studying technical manuals and attending technical training programs that are provided by equipment manufacturers.

Who is suited to become a Biomedical Engineering Technologist?

Biomedical engineering technologists are most effective when they have the following skills and characteristics:

- strong verbal and written communication skills
- strong problem solving skills
- the ability to stay patient and thoughtful with people who may be upset
- the ability to work well under pressure
- the desire to learn and work with technology
- physical ability to use tools and move equipment (the ability to lift up to 20 kg is required)
- the desire to work in a health care setting
- strong time management skills.

They should enjoy:

- working in a health care environment with multidisciplinary teams

- using tools and specialized equipment to test the performance of components, assemblies and systems
- analyzing and diagnosing problems
- installing or supervising the installation of equipment and systems
- sharing information with colleagues and teaching patients.

Who employs Biomedical Engineering Technologist?

Biomedical engineering technologists are employed by:

- regional health authorities
- health care research facilities
- biomedical equipment manufacturers
- third party maintenance companies (contractors).

Biomedical engineering technologists who work in health care facilities may have to work rotating shifts. This might involve working on weekends and holidays, or being on call for emergencies. They may be exposed to diseases and must wear protective clothing such as rubber gloves and masks in some environments. Working in emergency situations can be stressful.

Biomedical engineering technologists employed by equipment manufacturers or service companies may be required to do a considerable amount of travelling.

Salary

Salary - $49,479-$71,983

Training and education required to become Biomedical Engineering Technologist

The minimum education requirement for biomedical engineering technologists is a two year diploma in a related technology.

In general, graduates from the Biomedical Engineering Technology program receive a Diploma of Technology in Biomedical Engineering Technology. The program provides education and training in the following subject areas: technical communication, algebra, calculus, statistics, basic bio- and analytical chemistry, human anatomy and physiology, biophysics, electricity and electronics, digital techniques and microprocessor applications, biomedical devices and systems, medical equipment-related standards and quality assurance protocols. During the second year, each student spends a number of weeks in supervised training in a local hospital, research agency, or equipment supply company. Graduates work closely with biomedical engineers, technologists, and doctors. They also spend time with others who use, manage, maintain, design, manufacture, and supply scientific and medical equipment.

The program provides hands-on laboratory experience, and trains students in engineering problem-solving methodology. The program also teaches students to upgrade and maintain their knowledge.

New graduated students can apply for membership in the Canadian Medical and Biological Engineering Society (CMBES) and the Applied Science Technologists and Technicians of British Columbia (ASTTBC).

The Canadian Technology Accreditation Board (CTAB) accredits the Biomedical Engineering Technology program. Graduates are eligible for registration as Applied Science Technologists (AScT) through ASTTBC after two years of relevant work experience following graduation.

Career Advancement

Experienced biomedical engineering technologists may advance to supervisory positions or move into related positions in their employment organizations. Additional education is required to become a biomedical or clinical engineer.

Education Programs

British Columbia Institute of Technology
http://www.bcit.ca/study/programs/5050diplt

Simon Fraser University
http://www.ensc.sfu.ca/undergraduate_students/admissions.html

University of Victoria
www.ece.uvic.ca/ugrad/EE-BIOMED-beng.shtml

University of British Columbia
http://www.bme.ubc.ca/

Northern Alberta Institute of Technology
www.nait.ab.ca

University of Alberta
www.bme.med.ualberta.ca

University of Calgary
http://www.ucalgary.ca/bme/undergraduate/admission

University of Manitoba
www.umanitoba.ca/engineering

University of Saskatchewan
www.engr.usask.ca/dept/biomed

College of the North Atlantic
www.northatlantic.nf.ca
Memorial University of Newfoundland
www.engr.mun.ca

Dalhousie University
www.dal.ca/bme

University of New Brunswick
www.unb.ca/biomed

Université Du Moncton
www.umoncton.ca/

University of Prince Edward Island
www.upei.ca

Durham College
https://myplace.durhamcollege.ca/durham/program.do?from=subject&programID=51

University of Guelph
www.eos.uoguelph.ca

Carleton University
www.eng.carleton.ca

Queen's University
Human Mobility Research Centre
http://engineering.queensu.ca/programs/bme/Curriculum.html

McMaster University
msbe.mcmaster.ca

Ryerson University
www.ee.ryerson.ca

University of Ottawa
www.site.uottawa.ca

University of Waterloo
www.eng.uwaterloo.ca

University of Toronto
www.ibbme.utoronto.ca

University of Windsor
Faculty of Graduate Studies & Research
www.uwindsor.ca

Concordia University
www.encs.concordia.ca

Ecole Polytechnique Montréal
www.polymtl.ca/udr20.htm

Université Laval
www.gel.ulaval.ca

McGill University
Biomedical Engineering Department
www.bmed.mcgill.ca

Université de Montréal
www.igb.umontreal.ca
Université de Sherbrooke
www.usherb.ca

Université du Québec Trois-Rivières
www.uqtr.ca

Financial assistance and bursaries

For information about Canada student loans and grants, please visit:
http://www.hrsdc.gc.ca/eng/learning/canada_student_loan/index.shtml

Associations

Institute of Biomedical Engineering
http://ibet.asttbc.org/

Applied Science Technologists & Technicians of British Columbia
http://www.asttbc.org/