

Occupational Mapping for the Biomedical Engineering Sector

Medical Device Industry:

The Global medical device industry is poised to reach USD 543.9 Billion by 2020 driven by the increase in the lifespan of aging individuals as well as the increasing costs of healthcare globally. The Indian medical device market is currently established at USD 5.5 Billion and is growing yearly at a steady rate of 15% CARG. The new rules have been formulated to promote domestic manufacturing and also enable Indian manufactures to export the finished high-quality products from India to the world.

Identification of Occupations within the Sector & Sub Sectors

The Medical Device industry would require a varied profile of skill sets; the following figure presents an overview of the profile of skill requirements as derived from human resource requirements across different sectors of the medical device industry.

The various occupations of Biomedical Engineering:

- 1) Clinical Engineer
- 2) Sales Engineer
- 3) Service Engineer
- 4) Application Specialist
- 5) Procurement Engineer
- 6) Self Entrepreneur
- 7) Consultation Businesses
- 8) JCI or NABH consultant for Hospitals
- 9) Healthcare Finance
- 10) Healthcare IT
- 11) Rehabilitation Engineer
- 12) Intellectual Property Rights
- 13) Academic
- 14) Researcher / Scientist
- 15) Product Design Engineer
- 16) Quality Control Engineer
- 17) Validation and Verification Engineer
- 18) Market Research Analyst

Nature of Work

Biomedical Engineers play a vital role in patient care. They inspect, maintain, and repair the diagnostic, monitoring, therapeutic, and life-saving medical equipment – defibrillators, ventilators, monitors, medical imaging devices, clinical laboratory equipment and others – that are found in every hospital and medical clinic.

Examples of different areas of Medical equipment technology are:

- ❖ Diagnostic Imaging
 - Radiographic and fluoroscopic X-ray
 - Diagnostic ultrasound
 - Mammography
 - Nuclear Imaging
 - Positron emission tomography (PET)
 - Medical imaging
 - Computed Tomography (CT) Linear Tomography
 - Picture archiving and communication systems (PACS)
 - Magnetic Resonance Imaging (MRI scanner)
- ❖ Biomedical Technology
- ❖ Dental
- ❖ Heart Lung Device
- ❖ Optometry
- ❖ Surgical Instruments
- ❖ Infusion pumps
- ❖ Surgical instruments
- ❖ Anaesthesia
- ❖ Laboratory
- ❖ Dialysis
- ❖ Respiratory Services (ventilators)
- ❖ Cardiac Diagnostics

Qualifications, Skills and Knowledge

There are a number of possible pathways to becoming a MET. Many Medical Equipment Technicians come from trades backgrounds, such as mechanics or

electronics. A diploma or degree in Engineering (Electrical, Electronics or Mechanics) or related areas (Biomedical technology) is also a qualification for this field.

Employment Opportunities and Career Pathways

Biomedical Engineers are employed by medical devices companies, hospitals, clinics and laboratories to maintain and repair the medical equipment in these settings. In many cases, the primary employers are Medical Device companies who sign annual maintenance contracts with hospitals, clinics and laboratories. The Biomedical Engineers are then sent over to the hospital (or other users of medical devices) when required for inspection, calibration, repair and maintenance.

Job Description

Biomedical Engineers work closely with nursing staff and Medical Material personnel to obtain parts, supplies, and equipment and even closer with facility management to coordinate equipment installations requiring certain facility requirements/modifications. They help to train staff on usage and care of new equipment and conduct repairs where required.

Biomedical Engineers may perform the following tasks:

1. Install and carry out acceptance testing of biomedical equipment and support systems
2. Conduct preventative maintenance and repair broken equipment
3. Inspect, test and calibrate medical devices and technology
4. Conduct safety testing & standards compliance
5. Support the assessment of technology for the purchase of new equipment
6. Train and educate operators of medical equipment

Skill Gap Study

Healthcare has become one of India's largest sectors - both in terms of revenue generation and creating employment. Healthcare comprises of hospitals, medical devices, clinical trials, outsourcing, telemedicine, medical tourism, health insurance and medical equipment.

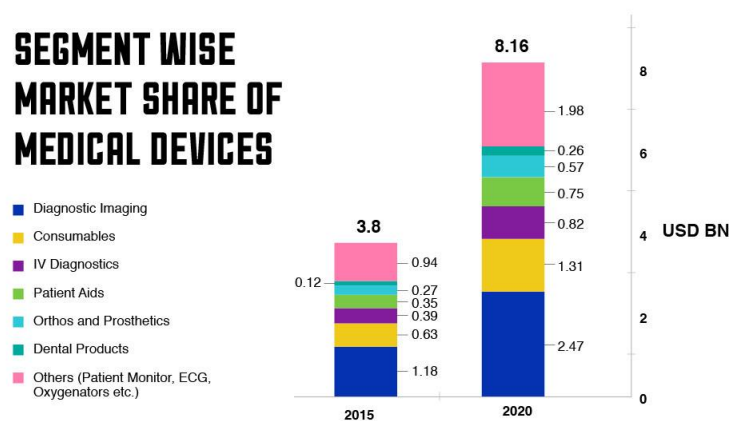
As per the detailed survey done by Ministry of Health & Family welfare, it is found that in India there are only 3.32 biomedical engineers per 1,00,000 population. Ministry has already urged the industry bodies and government to share the road map for biomedical engineering to take control of healthcare industry.

The report also indicates that 60% of the medical equipments in government institutions are in an unserviceable condition due to lack of maintenance. Hence rigorous training along with strong knowledge has to be imparted to these professionals.

Hence this certification paves the way for having a system in place for recognising the skills of biomedical engineers & apply their skills in their profession backed by a certificate.

Medical Device Industry Market Size

The healthcare market can increase by three-fold to Rs 8.6 trillion (US\$ 133.44 billion) by 2022.



India is experiencing 22-25 per cent growth in medical tourism and the industry is expected to double its size from US\$ 3.8 billion in 2015 to US\$ 8.16 billion by 2020 (according to Make in India website). Medical tourist arrivals in India increased to 1.07 million in January 2018 from 0.98 million in January 2017.

India is a land full of opportunities for professionals in the medical devices industry. India's healthcare industry is one of the fastest growing sectors and in the coming 10 years it is expected to touch \$275 billion in value. With medical tourism being a huge attraction, India places itself as the global destination for healthcare & services exports.

Potential of Biomedical Professionals in India

Number of Colleges offering BME course at various levels		
Course	Number of Colleges	Annual Intake
Diploma / ITI (Medical Electronics)	~ 30	~ 1,500
Engineering (B.E / B. Tech)	~ 100	~ 4,500
Masters (M.E / M. Tech)	~ 44	~ 8,50
Total		~ 6,850

The above statistics indicate that the potential candidates are available across India to become professional Health care Specialists. However, the University syllabus doesn't cover the breadth and depth of required skills. The main outline of IBSC is to develop skill programs in the areas of Medical Devices and related areas that fulfil the demand of manpower in hospitals, medical equipment agencies/traders, manufacturing units, research institutions etc. The certification process would also consider the updation of knowledge of professionals in the highly evolving medical technology science.

IBSC will certify the trained engineers which would impact the health care industry at a large scale. Only certified engineers will be recruited in Clinics / Hospitals / industries

or other related areas where they are already trained and skilled in their domains so that from the date of joining job they could start working effectively. Hence, employers may not need to focus on training to newly recruited employees at any level which in turn would save a lot of money and time for them.

To encourage best practices in Biomedical Engineering profession it's necessary to recognise the importance of skilled engineers and issue certification.
