National Skill Qualification Framework Level 3

HSS/Q/5601: Medical Equipment Technician (Basic Clinical Equipment)

Competency Based Curriculum

Healthcare Sector Skill Council

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Introduction

The term "**curriculum"** (plural: *curricula or curriculums*) is derived from the Latin word for "*race course"*, referring to the course of deeds and experiences through which children grow to become mature adults. A competency based curriculum describes what learners must "know" and "be able to do" by the end of a program or study. It identifies the competencies and sub-competencies each learner is expected to master. It gives brief outline of the course structure.

The **curriculum** is aligned with National Occupational Standard for Blood Bank Technician. It is broken down into coherent parts known as **Units**. Each unit has been aligned with NOS and is given notional learning hour for theory and skill training. In order to provide hands on training and sensitization to work place environment, notional hours for compulsory laboratory training is also prescribed.

As a supplement to this curriculum, detailed **Scheme of Work** mapped to the NOS to provide learners with the underpinning knowledge and understanding required to be able to carry out the role of Phlebotomy effectively along with the training and evaluation methodology, assessment framework and model question paper can be availed separately from HSSC. .

About the Sector

Healthcare sector in India has been growing rapidly over the years and is estimated to reach US$ 280 billion by 2020. Consequently, the sector is also experiencing an incremental demand for human resources across verticals; from doctors, nurses to allied health professionals and technicians. As per the recent PHFI report, India has a shortfall of 6 million Allied Health Professionals in the country.

India is far behind global standards in terms of availability of doctors per 1000 people (India 0.6; US 2.56 or UK 2.3) , nurses (India 0.8; US 9.37 or UK 12.12), Midwives (India 0.47; UK 0.63) and lab technicians (India 0.02; US 2.15)

To meet the growing human resource challenges, the National Skill Development Corporation & the Confederation of Indian Industry along with the Industry partner from public as well as private sector, have constituted the **Healthcare Sector Skill Council (HSSC)**. The objective of the council is to promote a vibrant vocational education system in healthcare in the country by setting up occupational standards, affiliating training institutes, assessing competency of trainees and issuing certificates. The council aims to facilitate skilling of 4.8 million people over the next 10 years in allied health & paramedics space.

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Objective of the Course

The objective of the program is to develop a pool of trained workforce which can be employed by medical device manufacturers, suppliers and service providers and bio-medical department of hospitals to assist installation, repair and maintenance of basic medical equipment and devices. This course is geared to prepare personal with 10+2 background preferably or class X in certain situations and who desire to be employed as a medical equipment technician in a healthcare setting or service providers. This program focuses on the acquisition of skills necessary to perform inspection, installation, preventative maintenance and troubleshooting of Basic Clinical Equipment and their related medical device/ electronic systems, including appropriate documentation for all service activities and training the hospital staff, whenever necessary. Upon completion of the course, trainees will be able to:

- Deliver and set-up medical equipment
- Provide Technical assistance, education & Training to hospital/facility staff
- Calibrate and help in equipment maintenance
- Diagnose, Repair and Provide on-call and on-site assistance for equipment malfunctions
- Schedule and Oversee Third Party Repair and Maintenance work
- Facilitate Biomedical Instrumentation Services for basic clinical equipment
- Follow biomedical waste disposal protocols
- Follow infection control policies and procedures
- Demonstrate techniques to maintain the personal hygiene needs
- Demonstrate actions in the event of medical and facility emergencies
- Demonstrate professional behavior, personal qualities and characteristics in professional practice of bio-medical instrumentation services
- Demonstrate good communication, communicate accurately and appropriately in the role of Medical Equipment Technician

Duration of the Course

Terms	Number of Notional Learning Hours		
	Theory	Practical	Total (in Hours)
Term 1	46	44	90
Term 2	40	50	90
Term 3	35	55	90
Term 4	40	50	90
Total (Term 1-4)	161	199	360
Laboratory Training/Clinical Training			240
Grand Total (All Terms + Clinical Training)			**600**

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National Occupational Standards

- HSS / N 5601 : Deliver and set-up medical equipment
- HSS / N 5602 : Train and educate hospital staff
- HSS / N 5603 : Calibrate and help in equipment maintenance
- HSS / N 5604 : Provide on-call ad on-site assistance
- HSS / N 9603 : Act within the limits of one's competence and authority
- HSS / N 9606 : Maintain a safe, healthy, and secure working environment
- HSS / N 9607 : Practice Code of conduct while performing duties

Course Structure: Term I (NSQF Level 3: MET-Basic Clinical Equipment)

Course Structure – This course (Vocational qualification package) is a planned sequence of instructions consisting of the following 11 modules called as Units.

Term I			
Sl No	**Unit Code**	**Unit Title**	**No of Notional Learning Hours**
1	Introduction	Healthcare delivery systems and role of medical devices	5 hrs. (3 Theory + 2 Practical)
2	Introduction	Medico-legal aspects of Health Information Portability and Accountability	5 hrs. (3 Theory + 2 Practical)
3	Introduction	Fundamentals of electricity and electronics	10 hrs. (5 Theory + 5 Practical)
4	Introduction	Fundamentals of Bio-Medical Instrumentation	10 hrs. (5 Theory + 5 Practical)
5	Introduction	Fundamentals of computer systems	10 hrs. (5 Theory + 5 Practical)
6	Introduction	Fundamentals of digital technology and their application in Biomedical Instrumentation	10 hrs. (5 Theory + 5 Practical)
7	Introduction	Electro/Mechanical, thermo dynamics, physics & instrumentations	10 hrs. (5 Theory + 5 Practical)
8	HSS/N/5601, HSS/N/5603, HSS/N/5604	Mechanical knowledge and use of tools	10 hrs. (5 Theory + 5 Practical)
9	HSS/N/5601, HSS/N/5603	Proper lifting techniques	5 hrs. (2 Theory + 3 Practical)
10	Introduction	Familiarity to medical terminology	5 hrs. (3 Theory + 2 Practical)
11	HSS / N/9606	Bio-medical Waste Management	10 hrs. (5 Theory + 5 Practical)
Total			90 (46 Theory + 44 Practical)

Course Structure: Term II (NSQF Level 3: MET-Basic Clinical Equipment)

Course Structure – This course (Vocational qualification package) is a planned sequence of instructions consisting of the following 4 modules called as Units.

Term II			
Sl No	**Unit Code**	**Unit Title**	**No of Notional Learning Hours**
1	HSS/ N 5601	Fundamental knowledge of Function and operation of all possible basic clinical equipment	30 hrs. (15 Theory + 15 Illustrative)
2	HSS/N 9606	Fundamental knowledge of different types of personal protective clothing, equipment and personnel monitoring devices	10 hrs. (5 Theory + 5 Illustrative)
3	HSS/N 5601	Fundamentals of delivery, Installation and set-up of the basic medical equipment	25 hrs. (10 Theory + 15 Illustrative)
4	HSS/N 5603	Fundamentals of periodic Preventive Maintenance of the basic medical equipment	25 hrs. (10 Theory + 15 Illustrative)
Total			90 (40 Theory + 50 Practical)

Course Structure: Term III (NSQF Level 3: MET-Basic Clinical Equipment)

Course Structure – This course (Vocational qualification package) is a planned sequence of instructions consisting of the following 5 modules called as Units.

Term III			
Sl No	**Unit Code**	**Unit Title**	**No of Notional Learning Hours**
1	HSS/N 5603	Fundamentals of Calibration of the basic clinical equipment	30 hrs. (10 Theory + 20 Illustrative)
2	HSS/N 5604	Fundamentals of Diagnosis & Repair the faults of the basic medical equipment	30 hrs. (10 Theory + 20 Illustrative)
3	HSS/N 9606	Safety issues, Emergencies & Troubleshooting	10 hrs. (5 Theory + 5 Illustrative)
4	HSS/ N 9607	Standards & Best Practices related to Bio-Medical Instrumentation	10 hrs. (5 Theory + 5 Illustrative)
5	HSS/ N 9603, HSS/N 9607	Soft Skills & Communication	10 hrs. (5 Theory + 5 Illustrative)
Total			90 (35 Theory + 55 Practical)

Course Structure: Term IV (NSQF Level 3: MET-Basic Clinical Equipment)

Course Structure – This course (Vocational qualification package) is a planned sequence of instructions consisting of the following 5 modules called as Units.

Term IV			
Sl No	**Unit Code**	**Unit Title**	**No of Notional Learning Hours**
1	HSS/ N 5604	Fundamentals of on-call and on-site Technical Assistance of the basic medical equipment	25 hrs. (10 Theory + 15 Illustrative)
2	HSS/ N 5602	Fundamentals of training, education and assessment of the staff on the basic medical equipment	25 hrs. (10 Theory + 15 Illustrative)
3	HSS/ N 5601, HSS/N 5603, HSS/N 5604	Third party interface	20 hrs. (10 Theory + 10 Illustrative)
4	HSS/ N 5601-04	Documentation, Database and Retrieval	10 hrs. (5 Theory + 5 Illustrative)
5	HSS/ N 5601-04	Basic Computer Knowledge	10 hrs. (5 Theory + 5 Illustrative)
Total			90 (40 Theory + 50 Practical)

Teacher's Qualifications

Qualification, competencies and other requirements for Instructors on contractual basis are as follows:

- B. Tech. (Biomedical Engineering) with 1 year experience in the field.