



# Model Curriculum

**QP Name: Medical Equipment Assistant (Basic Clinical Equipment)**

**QP Code: HSS/Q5601**

**QP Version: 3.0**

**NSQF Level: 4**

**Model Curriculum Version: 1.0**

Healthcare Sector Skill Council || Healthcare Sector Skill Council, 520, DLF Tower A, 5th Floor, Jasola  
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## Training Parameters

|   |  |
|---|--|
| <b>Sector</b>   | Healthcare   |
| <b>Sub-Sector</b>                                       | Allied Health & Paramedics   |
| <b>Occupation</b>                                       | Non-Direct Care  |
| <b>Country</b>  | India  |
| <b>NSQF Level</b>                                       | 4  |
| <b>Aligned to NCO/ISCO/ISIC Code</b>                    | NCO-2015/3211.0501   |
| <b>Minimum Educational Qualification and Experience</b> | <ul style="list-style-type: none"> <li>• 12th Grade Pass</li> <li>or</li> <li>• Pursuing 1st year of UG</li> <li>or</li> <li>• Completed 2nd year of the 3-year diploma after 10</li> <li>or</li> <li>• Pursuing 3rd year of 3-year diploma after 10<sup>th</sup></li> <li>or</li> <li>• Pursuing 1st year of 2-year diploma after 12<sup>th</sup></li> <li>or</li> <li>• 10th Grade pass plus 3 years of vocational education &amp; Training</li> <li>or</li> <li>• 8th Grade pass with 2 year NTC plus 1 year NAC plus 1 year CITS</li> <li>or</li> <li>• Previous relevant Qualification of NSQF Level 4 and with minimum education as 8th Grade pass with 1 year of relevant experience</li> </ul> |
| <b>Pre-Requisite License or Training</b>                | Not Applicable   |
| <b>Minimum Job Entry Age</b>                            | 18 Years   |
| <b>Last Reviewed On</b>                                 | 17/11/2022   |
| <b>Next Review Date</b>                                 | 31/03/2025   |
| <b>NSQC Approval Date</b>                               | 31/03/2022   |
| <b>QP Version</b>                                       | 3.0  |
| <b>Model Curriculum Creation Date</b>                   | 31/03/22   |
| <b>Model Curriculum Valid Up to Date</b>                | 31/03/25   |

|                                       |          |
|---------------------------------------|----------|
| <b>Model Curriculum Version</b>       | 1.0      |
| <b>Minimum Duration of the Course</b> | 510 Hrs. |
| <b>Maximum Duration of the Course</b> | 510 Hrs. |

## Program Overview

This section summarizes the end objectives of the program along with its duration.

### Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills.

- Demonstrate technical skills in supporting service engineer while installation of basic medical equipment.
- Provide technical assistance and instruction to the hospital staff on the installed medical equipment operation and maintenance safely and correctly.
- Conduct scheduled preventive maintenance
- Maintain inventory of parts and supplies
- Diagnose, repair and provide on-call and on-site assistance for equipment malfunctions.
- Schedule and oversee third party repair and maintenance work
- Describe and follow safety procedures while working with the equipment and at the workplace
- Manage work efficiently in professional practice of bio-medical instrumentation services
- Demonstrate technical and communication skills while facilitating biomedical instrumentation services for basic clinical equipment

### Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

| NOS and Module Details  | Theory Duration | Practical Duration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
|---|-----------------|--------------------|--|--|----------------|
| <b>Bridge Modules</b>   | <b>10:00</b>    | <b>20:00</b>       | <b>00:00</b>                             | <b>00:00</b>                               | <b>30:00</b>   |
| <a href="#">Module 1: Introduction to healthcare delivery systems and role of medical equipment and devices</a> | 2:00            | 5:00               | 00:00                                    | 00:00                                      |                |
| <a href="#">Module 2: Basic computer knowledge</a>  | 3:00            | 5:00               | 00:00                                    | 00:00                                      |                |
| <a href="#">Module 3: Basics of tools and medical terminology</a>   | 5:00            | 10:00              | 00:00                                    | 00:00                                      |                |
| <b>HSS/N5601: Deliver and set-up medical equipment</b>  | <b>57:00</b>    | <b>63:00</b>       | <b>15:00</b>                             | <b>00:00</b>                               | <b>135:00</b>  |

|  |              |              |              |              |              |
|--|--------------|--------------|--------------|--------------|--------------|
| <a href="#">Module 4:<br/>Fundamentals of<br/>Electro/Mechanical,<br/>thermo dynamics,<br/>physics &amp;<br/>instrumentations</a>            | 10:00        | 28:00        | 00:00        | 00:00        |              |
| <a href="#">Module 5:<br/>Fundamental<br/>knowledge of function<br/>and operation of basic<br/>clinical equipment</a>                        | 15:00        | 15:00        | 00:00        | 00:00        |              |
| <a href="#">Module 6:<br/>Fundamentals of<br/>delivery, installation<br/>and set-up of the basic<br/>medical equipment</a>                   | 32:00        | 20:00        | 00:00        | 00:00        |              |
| <b>HSS/N5602: Train and<br/>educate hospital staff</b>   | <b>23:00</b> | <b>32:00</b> | <b>20.00</b> | <b>00:00</b> | <b>75:00</b> |
| <a href="#">Module 7:<br/>Fundamentals of<br/>training, education and<br/>assessment of the staff<br/>on the basic medical<br/>equipment</a> | 23:00        | 32:00        | 00:00        | 00:00        |              |
| <b>HSS/N5603: Calibrate<br/>and help in equipment<br/>maintenance</b>  | <b>15:00</b> | <b>35:00</b> | <b>25.00</b> | <b>00:00</b> | <b>75:00</b> |
| <a href="#">Module 8:<br/>Fundamentals of<br/>periodic preventive<br/>maintenance of the<br/>basic medical<br/>equipment</a>                 | 15:00        | 35:00        | 00:00        | 00:00        |              |
| <b>HSS/N5604: Provide on-<br/>call and on-site<br/>assistance</b>  | <b>30:00</b> | <b>45:00</b> | <b>15.00</b> | <b>00:00</b> | <b>90:00</b> |
| <a href="#">Module 9: On-call and<br/>on-site assistance for<br/>common faults of the<br/>basic medical<br/>equipment</a>                    | 30:00        | 45:00        | 00:00        | 00:00        |              |

|  |               |               |              |              |               |
|--|---------------|---------------|--------------|--------------|---------------|
| HSS/N9603: Act within the limits of one's competence and authority | 5:00          | 5:00          | 05:00        | 00:00        | 15:00         |
| <u>Module 10: Soft skills and communication</u>                    | 5:00          | 5:00          | 00:00        | 00:00        |               |
| HSS/N9606: Maintain a safe working environment                     | 05:00         | 05:00         | 05:00        | 00:00        | 15:00         |
| <u>Module 11: Safety and Emergency response</u>                    | 8:00          | 7:00          | 00:00        | 00:00        |               |
| <u>Module 12: Orientation to First Aid</u>                         | 7:00          | 8:00          | 00:00        | 00:00        |               |
| HSS/N9607: Practice Code of conduct while performing duties        | 5:00          | 5:00          | 05:00        | 00:00        | 15:00         |
| <u>Module 13: Professional standards of grooming and conduct</u>   | 5:00          | 5:00          | 00:00        | 00:00        |               |
| <b>Sub-Total</b>   | <b>150:00</b> | <b>210:00</b> | <b>90:00</b> | <b>00:00</b> | <b>450:00</b> |
| <u>Module 14: DGT/VSQ/N0102 : Employability Skills (60 Hours)</u>  | 60:00         | 00:00         | 00:00        | 00:00        | 60:00         |
| <b>Total</b>   | <b>210:00</b> | <b>210:00</b> | <b>90:00</b> | <b>00:00</b> | <b>510:00</b> |

# Module Details

## Module 1: Introduction to healthcare delivery systems and role of medical equipment and devices

*Mapped to: Bridge Module*

### Terminal Outcomes:

- Describe the basic structure and function of healthcare delivery system in India.
- Identify the basic medical equipment and devices.

| <b>Duration: 02:00</b>  | <b>Duration: 05:00</b>   |
|---|--|
| <b>Theory – Key Learning Outcomes</b>   | <b>Practical – Key Learning Outcomes</b>   |
| <ul style="list-style-type: none"> <li>• Discuss the healthcare delivery system in India at the primary, secondary, tertiary, and quaternary levels.</li> <li>• Distinguish between private, public, and non-profit healthcare delivery systems.</li> <li>• Differentiate between various healthcare services.</li> <li>• List different departments in a hospital.</li> <li>• Differentiate between medical devices and medical equipment</li> <li>• List the names and uses of basic medical devices and medical equipment</li> </ul> | <ul style="list-style-type: none"> <li>• Prepare a report summarizing the observations about basic structure and function of healthcare delivery system in India.</li> <li>• Spot the basic medical devices and medical equipment</li> </ul> |
| <b>Classroom Aids:</b>  |  |
| Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Board eraser   |  |
| <b>Tools, Equipment and Other Requirements</b>  |  |
| Visit to the hospital for field assignment  |  |



## Module 2: Basic computer knowledge

### Mapped to: Bridge Module

#### Terminal Outcomes:

- Demonstrate the use of computers and internet operations.
- Apply basic computer knowledge in performing various activities.

| <b>Duration: 03:00</b>   | <b>Duration: 05:00</b>  |
|--|---|
| <b>Theory – Key Learning Outcomes</b>  | <b>Practical – Key Learning Outcomes</b>  |
| <ul style="list-style-type: none"> <li>• List the fundamental hardware components that make up a computer's hardware and the role of each of these components.</li> <li>• Distinguish between an operating system and an application program, and what each is used for in a computer.</li> <li>• Identify the principal components of a given computer system.</li> </ul> | <ul style="list-style-type: none"> <li>• Demonstrate data entry, taking backups, saving, and retrieving the files, maintaining, and changing network connectivity process.</li> <li>• Prepare reports/documents/ demand request using word processing software and spreadsheets.</li> <li>• Demonstrate the use of browser functions to surf on the internet, send emails.</li> </ul> |
| <b>Classroom Aids:</b>   |   |
| Charts, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster  |   |
| <b>Tools, Equipment and Other Requirements</b>   |   |
| Computer with internet facility and latest version of software   |   |

## Module 3: Basics of tools and medical terminology

### Mapped to: Bridge Module

#### Terminal Outcomes:

- Describe mechanical knowledge and use of tools.
- Apply basic medical terminology in everyday professional conversation.
- Apply proper lifting techniques while working with medical equipment.

| <b>Duration: 05:00</b>   | <b>Duration: 10:00</b>  |
|--|---|
| <b>Theory – Key Learning Outcomes</b>  | <b>Practical – Key Learning Outcomes</b>  |
| <ul style="list-style-type: none"> <li>• List various tools used for performing basic repair and maintenance of medical equipment.</li> <li>• Explain the functions of each tool.</li> <li>• Explain the importance of following proper lifting techniques</li> <li>• Describe do's and don'ts of lifting techniques.</li> <li>• Familiarize with the medical terminology used in everyday practice.</li> </ul>  | <ul style="list-style-type: none"> <li>• Prepare a chart detailing various tools used for performing basic repair and maintenance of medical equipment.</li> <li>• Create a portable tool kit.</li> <li>• Demonstrate the lifting techniques of medical equipment.</li> </ul> |
| <b>Classroom Aids:</b>   |   |
| Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster.   |   |
| <b>Tools, Equipment and Other Requirements</b>   |   |
| Defibrillator analyzer, Hand tools, Non-invasive blood pressure (NIBP) analyzer, Tachometer, Spectrum analyzer, Electrical safety analyzer, Electrical surgical unit (ESU) analyzer, Patient simulators (e.g. SpO2 simulator), Personal protective equipment (PPE), Frequency scanner, Fetal monitor simulator, Phantoms, O2 meter, Watt meter, Cabling, terminals, Test lungs, IV testers, Pressure meters, Diagnostic software, Test equipment, Maintenance Management Systems |   |

## Module 4: Fundamentals of Electro/Mechanical, thermo dynamics, physics & instrumentations

Mapped to: HSS/N5601,

### Terminal Outcomes:

- Apply fundamental concepts of electricity and electronics, bio-medical instrumentation, computer systems and digital technology during delivering the work.

| <b>Duration: 10:00</b>  | <b>Duration: 28:00</b>  |
|---|---|
| <b>Theory – Key Learning Outcomes</b>   | <b>Practical – Key Learning Outcomes</b>  |
| <ul style="list-style-type: none"> <li>• Discuss fundamental concepts of electricity and electronics including concepts of ac circuits, dc circuits, magnetic circuits, transformers, ac machines and other electrical machines and their application in Biomedical Instrumentation.</li> <li>• Discuss fundamental concepts of Bio-Medical Instrumentation including concepts of measurement, transducers, analog instruments, measuring circuits, display devices, soldering, etc. and their application in Biomedical Instrumentation.</li> <li>• Discuss fundamental concepts of computer systems like data, management and informatics related systems and their application in Biomedical Instrumentation.</li> <li>• Discuss fundamental concepts of digital technology and their application in Biomedical Instrumentation.</li> <li>• Discuss the various electrical, temperature and pressure standards.</li> </ul> | <ul style="list-style-type: none"> <li>• Identify the electronic components used in Household appliances, communication kits, and electrical appliances.</li> <li>• Measure given dimensions by using appropriate instruments accurately.</li> <li>• Select proper measuring instrument on the basis of range, least count &amp; precision required for measurement.</li> <li>• Draw the basic circuits of rectifier, filter, regulator and amplifiers.</li> <li>• Perform the testing using multimeter.</li> <li>• Prepare a chart depicting the electronic components and their functions.</li> <li>• Read the various symbols of a circuit diagram and a circuit diagram.</li> <li>• Identify the different tools required to solder and desolder the surface mounted devices (SMDs).</li> <li>• Identify the typical case sizes, shape and markings of some common SMDs.</li> <li>• Identify the resistor markings and typical values.</li> </ul> |
| <b>Classroom Aids:</b>  |   |
| Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, board eraser   |   |
| <b>Tools, Equipment and Other Requirements</b>  |   |
| Circuit, SMDs, multimeter, some electrical appliances   |   |

## Module 5: Fundamental knowledge of function and operation of basic clinical equipment

Mapped to: HSS/N5601,

### Terminal Outcomes:

- Differentiate between normal and abnormal functioning of the basic clinical equipment.
- Apply the principles of operation of basic clinical equipment while testing of them.

| <b>Duration: 15:00</b>   | <b>Duration: 15:00</b>  |
|--|---|
| <b>Theory – Key Learning Outcomes</b>  | <b>Practical – Key Learning Outcomes</b>  |
| <ul style="list-style-type: none"> <li>• List the various types of basic clinical equipment required in various departments such as OPD, IPD, Diagnostic, Surgical, Emergency, etc</li> <li>• Discuss the basic functioning and operation of basic clinical equipment required in various departments such as BP instrument, thermometer, glucometer, ward equipment, sterilization equipment, stethoscope, scales, bariatric equipment, recliners, etc.</li> <li>• Identify the circuits of the basic clinical equipment.</li> <li>• Identify the electronic components in the basic clinical equipment.</li> <li>• Identify different types of cables and connectors used in medical equipment.</li> <li>• Identify the types of socket outlets, plugs and wiring of sockets and plugs in the basic clinical equipment.</li> <li>• Discuss the various plug and socket classifications based on their types.</li> <li>• Discuss the working of spectrum.</li> <li>• Discuss the applications of electro-magnetic radiations in functioning medical equipment.</li> <li>• Describe the Printed Circuit Boards (PCB) fabrication process.</li> <li>• Describe the importance of reading data sheets of diode and transistors.</li> </ul> | <ul style="list-style-type: none"> <li>• Demonstrate the basic functioning of basic clinical equipment.</li> <li>• Prepare a chart depicting various components of the basic clinical equipment.</li> <li>• Demonstrate the steps of PCB fabrication process.</li> <li>• Read data sheets of diode and transistors and test accordingly.</li> </ul> |
| <b>Classroom Aids:</b>   |   |
| Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster  |   |
| <b>Tools, Equipment and Other Requirements</b>   |   |
| Various types of sockets, plugs, connectors, wires, PCBs.<br>Dummy medical equipment like BP instrument, thermometer, glucometer, ward equipment, sterilization equipment, stethoscope, scales, bariatric equipment, recliners<br>Charts and diagrams of circuits  |   |

## Module 6: Fundamentals of delivery, installation and set-up of the basic medical equipment

*Mapped to: HSS/N5601,*

### Terminal Outcomes:

- Perform pre-installation site visit before delivery.
- Receive, inspect and inventory equipment upon delivery.
- Deliver equipment to installation location.
- Help install equipment with service engineer.

| <b>Duration: 32:00</b>   | <b>Duration: 20:00</b>  |
|--|---|
| <b>Theory – Key Learning Outcomes</b>  | <b>Practical – Key Learning Outcomes</b>  |
| <ul style="list-style-type: none"> <li>• Describe the importance of checking, filling and entering the related forms required during equipment set-up like inspection form, work order form, installation form, commissioning form, QA form, etc.</li> <li>• Discuss the steps of assembling and disassembling the equipment appropriately.</li> <li>• Discuss the importance of performing quality assurance tests and dry run testing.</li> <li>• Discuss the protocols of receipt, installation and commissioning of equipment.</li> <li>• Describe the importance of delivery of accessories, spare parts, operating and service manuals along with equipment.</li> <li>• Describe the inventory management best practices.</li> <li>• Discuss about the condemnation guidelines for equipment or logistics which are outdated or in non-working condition.</li> <li>• Discuss how to maintain the record of available equipment, accessories, spare parts, operating and service manuals and their inventory communication with concerned hospital staff.</li> <li>• Discuss about SOP of reporting or discarding the expired consumables.</li> </ul> | <ul style="list-style-type: none"> <li>• Check, fill and enter the dummy inspection form, work order form, installation form, commissioning form, QA form, and other forms required during equipment set-up.</li> <li>• Disassemble and assemble the various parts of the basic clinical equipment.</li> <li>• Demonstrate steps of quality assurance tests and dry run testing.</li> <li>• Practice receipt, installation and commissioning of equipment through role plays.</li> <li>• Prepare a sample checklist to check availability of equipment, accessories, spare parts, operating and service manuals.</li> </ul> |
| <b>Classroom Aids:</b>   |   |
| Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster  |   |
| <b>Tools, Equipment and Other Requirements</b>   |   |
| dummy inspection form, work order form, installation form, commissioning form, QA form, and other forms required during equipment set-up   |   |

## Module 7: Fundamentals of training, education and assessment of the staff on the basic medical equipment

*Mapped to: HSS/N5602,*

### Terminal Outcomes:

- Provide technical assistance and instruction to the hospital staff on the installed medical equipment operation and maintenance safely and correctly

| <b>Duration:</b> 13:00   | <b>Duration:</b> 22:00  |
|--|---|
| <b>Theory – Key Learning Outcomes</b>  | <b>Practical – Key Learning Outcomes</b>  |
| <ul style="list-style-type: none"> <li>• Describe the importance of training and educating the hospital staff on safe and effective use and troubleshooting of equipment.</li> <li>• Describe the importance of documentation of all training and communication in the providers record, participant sign-in sheet verified by supervisor, all favourable facility staff feedback received during supervisor rounds, etc.</li> <li>• Discuss approaches to the needs, abilities, learning preferences, and language of the concerned hospital while tailoring training and instruction materials based on manufacturer documentation or checklist.</li> <li>• Discuss the role in providing written instructions to the hospital staff for equipment.</li> </ul> | <ul style="list-style-type: none"> <li>• Set up apparatus for experimental, demonstration or other purposes.</li> <li>• Prepare a sample set of document file related to all training and communication in the providers record, participant sign-in sheet verified by supervisor, all favourable facility staff feedback received during supervisor rounds, etc.</li> <li>• Create training and instruction materials related to the set-up, features, routine use, trouble shooting, cleaning, and maintenance of basic equipment based on provided manufacturer documentation or checklist.</li> </ul> |
| <b>Classroom Aids:</b>   |   |
| Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster  |   |
| <b>Tools, Equipment and Other Requirements</b>   |   |
| Sample instruction and training materials on use of equipment  |   |

## Module 8: Fundamentals of periodic preventive maintenance of the basic medical equipment

*Mapped to: HSS/N5603,*

### Terminal Outcomes:

- Ensure preventive maintenance task is complete within specified departmental time period.
- Maintain orders, supplies and returns of parts or equipment through approved vendors or manufacturers.
- Carry out proper documentation of calibration and preventive maintenance tasks.

| <b>Duration: 15:00</b>  | <b>Duration: 35:00</b>   |
|---|--|
| <b>Theory – Key Learning Outcomes</b>   | <b>Practical – Key Learning Outcomes</b>   |
| <ul style="list-style-type: none"> <li>• Describe importance of reviewing technical manuals and regularly attending training sessions.</li> <li>• Discuss the protocols related to conducting, recording and taking necessary action during calibration and preventive maintenance</li> <li>• Discuss about the maintenance of work order/calibration sheet and its specifications, documentation, updation, review, verification and involved officials.</li> <li>• Discuss the steps of cleaning of all assemblies and checking of quantity and quality machine oil and distilled water in medical equipment.</li> <li>• Describe the importance of correct identification of the orders, supplies and returns of parts or equipment on order documentation.</li> </ul> | <ul style="list-style-type: none"> <li>• Prepare a sample maintenance checklist (such as: Power cable, power module, functional check, calibration if required using the electrical safety analyser, etc.)</li> <li>• Prepare a dummy portable toolkit required for preventive maintenance.</li> <li>• Demonstrate the steps of cleaning of all assemblies and checking of quantity and quality machine oil and distilled water in medical equipment.</li> <li>• Demonstrate oiling or greasing of the mechanical moving parts.</li> </ul> |
| <b>Classroom Aids:</b>  |  |
| Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster   |  |
| <b>Tools, Equipment and Other Requirements</b>  |  |
| Toolkit, sample checklists and forms required for equipment maintenance   |  |

## Module 9: On-call and on-site assistance for common faults of the basic medical equipment

Mapped to: HSS/N5604,

### Terminal Outcomes:

- Respond to device failures reported by users on-call.
- Diagnose and repair basic equipment malfunctions on-site.
- Schedule and oversee third party repair and maintenance work.
- Carry out proper documentation of on-call and on-site assistance and repairs.

| Duration: 30:00  | Duration: 45:00   |
|--|---|
| Theory – Key Learning Outcomes   | Practical – Key Learning Outcomes   |
| <ul style="list-style-type: none"> <li>• Identify the types of main disconnect and service panel capacities (60, 100, 200 amp, etc.).</li> <li>• Discuss the remedial measures for common main disconnect problems.</li> <li>• Differentiate whether the fault could be corrected by the person or requires third party interface.</li> <li>• Discuss the scope and limitations of providing on-call assistance.</li> <li>• Discuss the importance of providing on call assistance in case of any urgency or emergency</li> <li>• Discuss the importance of taking special care while doing repair of the medical equipment sometimes when it is being used on the patient to ensure that repairs do not disturb patients.</li> <li>• Discuss about winding and rating of motor.</li> <li>• Discuss the regulations to test, evaluate, and classify excess or in-use medical equipment.</li> <li>• Discuss protocols to conduct, record and take necessary action during on-call and on-site assistance for equipment malfunctions.</li> <li>• Identify the need of third-party interface and appropriate vendors for the same.</li> <li>• List the resources required to facilitate repairs through third party.</li> <li>• Discuss the importance of conducting quality assurance check of both self-repairs and third-party repairs.</li> <li>• List the elements needs to be verified in the third-party documentation of repairs.</li> <li>• Explain the documentation related to equipment returned to unit or facility after repair and maintenance.</li> </ul> | <ul style="list-style-type: none"> <li>• Identify the common fault in the sample equipment.</li> <li>• Demonstrate opening of the motor, rectifying and repairing of the fault.</li> <li>• Demonstrate opening of the motherboard, checking the circuit and repairing of the fault.</li> <li>• Demonstrate fitting or refitting of the motor or pumps in heavy machines with proper alignment.</li> <li>• Determine serviceability, condition, and disposition of medical equipment in accordance with regulations.</li> <li>• Identify the equipment malfunction/ maintenance which needs to be addressed through third party vendor.</li> <li>• Carry out performance verification and final operational check of the equipment repaired/part replaced/ maintenance done as per manufacturer specification and users' requirements.</li> <li>• Prepare a sample documentation file related to self-repairs and third-party repairs.</li> <li>• Practice reviewing the sample documentation file related to completion of all required input and relevant checklists or forms.</li> <li>• Practice entering dummy data in the facility maintenance management system.</li> </ul> |
| <b>Classroom Aids:</b>   |   |



Charts, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Board eraser

**Tools, Equipment and Other Requirements**

Various types of sockets, plugs, connectors, wires, PCBs.

Dummy medical equipment like BP instrument, thermometer, glucometer, ward equipment, sterilization equipment, stethoscope, scales, bariatric equipment, recliners

Charts and diagrams of circuits

## Module 10: Soft skills and communication

Mapped to: HSS/N9603,

### Terminal Outcomes:

- Communicate effectively with co-workers.
- Organize and prioritize work to complete assignments on time.
- Adhere to organizational code of conduct while handling conflicts.

| Duration: 05:00  | Duration: 05:00  |
|--|--|
| Theory – Key Learning Outcomes   | Practical – Key Learning Outcomes  |
| <ul style="list-style-type: none"> <li>• Discuss the importance of effective communication with patients, relatives, and colleagues.</li> <li>• Describe the attributes of a team player.</li> <li>• Discuss about confidentiality and privacy practices related to patient’s information.</li> <li>• Discuss the importance of teamwork.</li> <li>• Explain work ethics in the hospital set up.</li> <li>• Discuss the importance of following rules and policies of organization for maintaining code of conduct and scope of work.</li> <li>• Discuss the various communication styles for maintaining gender neutral behaviour and PwD (Divyangs) sensitivity.</li> <li>• Inculcate readiness to work during odd hours in case of any urgency or emergency.</li> </ul> | <ul style="list-style-type: none"> <li>• Demonstrate the usage of technical terms to ensure effective communication.</li> <li>• Apply time management skills during daily activities.</li> <li>• Demonstrate the use of reading and writing skills in written communication.</li> <li>• Demonstrate problem solving and decision-making skills in different situations.</li> <li>• Demonstrate skills of teamwork and work prioritization in different team activities.</li> <li>• Demonstrate basic telephone and email etiquettes.</li> <li>• Prepare reports using the information gathered from observation, experience, reasoning, or communication.</li> </ul> |
| <b>Classroom Aids:</b>   |  |
| Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster  |  |
| <b>Tools, Equipment and Other Requirements</b>   |  |
| Case studies and demonstrative videos on teamwork, group dynamics  |  |

## Module 11: Safety and Emergency response

Mapped to: HSS/N9606,

### Terminal Outcomes:

- Respond to institutional emergencies appropriately.
- Apply self-hygiene and follow infection control guidelines.
- Demonstrate correct waste disposal methods as per guidelines and regulations

| Duration: 08:00   | Duration: 07:00  |
|---|--|
| Theory - Key Learning Outcomes  | Practical - Key Learning Outcomes  |
| <ul style="list-style-type: none"> <li>• List the precautions to be taken for personal safety.</li> <li>• Explain the use of protective devices such as safety devices.</li> <li>• Discuss about the chain of survival (in &amp; out of hospital scenario).</li> <li>• Explain about fire emergencies and safe use of electrical appliances</li> <li>• Explain about disaster management techniques to deal with institutional emergencies.</li> <li>• List the common emergencies which could happen in and out of institutions like trauma, snake bites, accidents, dog-bite, sprains, choking, fainting, unconsciousness, etc.</li> <li>• Discuss about importance of basic awareness about safety precautions, method of troubleshooting in emergency and escalation matrix for next level for support</li> <li>• Discuss about the specific regulations for dealing with radiations, pressure, vacuum, etc.</li> <li>• List the considered dangerous and critical support equipment in the medical field.</li> <li>• Describe the special care needed when dealing with mother board and other electronic components.</li> <li>• List the hazards which could happen in and around work areas and discuss how to set up appropriate barriers and precautions to ensure public and employee safety in the healthcare facility.</li> <li>• Identify PPE to be used at workplace and the process of donning, doffing, and discarding them.</li> <li>• Discuss the importance and process of identifying and reporting symptoms to the concerned authorities.</li> </ul> | <ul style="list-style-type: none"> <li>• Demonstrate basic emergency response in a mock drill depicting an institutional emergency.</li> <li>• Create a chart depicting different types of protective devices such as safety devices.</li> <li>• Demonstrate the method of bandages and dressing.</li> <li>• Identify safety hazards, troubleshoot the problem, take corrective measures within short span of time.</li> <li>• Demonstrate the correct way of washing hands using soap and water, and alcohol-based hand rubs.</li> <li>• Display the correct way of donning, doffing and discarding PPE such as face masks, hand gloves, face shields, PPE suits, etc.</li> <li>• Demonstrate appropriate social and behavioural etiquette (greeting and meeting people, spitting/coughing/sneezing, etc.).</li> <li>• Select different types of waste and various types of colour coded bins/containers used for disposal of waste.</li> </ul> |

- Discuss organizational hygiene and sanitation guidelines and ways of following them and reporting breaches/gaps if any.
- Explain the importance and mechanism of proper and safe disposal, transportation, and treatment of waste.

**Classroom Aids:**

Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster

**Tools, Equipment and Other Requirements**

PPE kit, fire extinguisher, Different coded color bins, chart for color coding of bins

## Module 12: Orientation to First Aid

Mapped to: HSS/N9606,

### Terminal Outcomes:

- Perform Cardio-Pulmonary Resuscitation (CPR) as per standard procedure.
- Apply the standard protocols of providing first aid.

| <b>Duration: 07:00</b>  | <b>Duration: 08:00</b>  |
|---|---|
| <b>Theory - Key Learning Outcomes</b>   | <b>Practical - Key Learning Outcomes</b>  |
| <ul style="list-style-type: none"> <li>• Discuss about the good Samaritan Law and its general principles.</li> <li>• Describe the importance of maintaining local emergency numbers as prevalent in region.</li> <li>• Discuss about immediate safety responses such as switching off the ignition of the motor vehicle in case of a motor vehicle accident, cutting off main electrical switch before approaching a victim of suspected electrocution, etc.</li> <li>• Describe the guidelines and safety precautions that need to be followed when moving the victims such as special carrying procedures on stairs; pushing and pulling the victim, etc</li> <li>• Determine the need for additional help or assistance such as trained lifeguards or trained swimmers to extricate the drowning person.</li> <li>• Describe the standard procedure of Cardio Pulmonary Resuscitation (CPR).</li> <li>• Identify precautions to be taken for self-safety.</li> <li>• Explain the basic components of first aid kit.</li> <li>• List the various do's and don'ts to be followed while providing first aid care during trauma emergencies.</li> <li>• Describe about various bandaging and dressing procedures.</li> </ul> | <ul style="list-style-type: none"> <li>• Prepare a list of local emergency response agencies such as Emergency Medical Service (EMS) team, ambulance, bomb disposal squads, fire and police departments, etc. along with their contact details.</li> <li>• Demonstrate correct technique of providing CPR on manikin using both single rescuer and two rescuer methods.</li> <li>• Design a dummy portable and segregable first aid kit as per requirements.</li> <li>• Demonstrate appropriate techniques of providing first aid and bandaging.</li> <li>• Demonstrate the method of dressing</li> </ul> |
| <b>Classroom Aids:</b>  |   |
| Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster.  |   |
| <b>Tools, Equipment and Other Requirements</b>  |   |
| CPR Nursing Manikin, Mannequin, Ambu Bag with Mask Adult, Torch, Stretcher, cot, scoop  |   |

## Module 13: Professional standards of grooming and conduct

Mapped to: HSS/N9607,

### Terminal Outcomes:

- Display appropriate professional appearance for the workplace.
- Display helpful behaviour by assisting others in performing tasks in a positive manner, where required and possible.

| Duration: 05:00  | Duration: 05:00   |
|--|---|
| Theory - Key Learning Outcomes   | Practical - Key Learning Outcomes   |
| <ul style="list-style-type: none"> <li>• Explain the importance of professional appearance: clean uniform, neat and combed hair, polished footwear, well- manicured nails, etc.</li> <li>• Explain about importance of wearing masks and head gear in sensitive areas.</li> <li>• Explain the steps of social hand hygiene.</li> <li>• Consult with and assist others to maximize effectiveness and efficiency in carrying out tasks.</li> <li>• Demonstrate responsible and disciplined behavior at the workplace.</li> </ul> | <ul style="list-style-type: none"> <li>• Demonstrate the steps of social hand hygiene</li> <li>• Demonstrate steps of nail care.</li> </ul> |
| <b>Classroom Aids:</b>   |   |
| Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster  |   |
| <b>Tools, Equipment and Other Requirements</b>   |   |
| PPE, Sink, Liquid Soap, Hand washing Poster, Paper Towel   |   |

## Module 14: Employability Skills (60 hours)

Mapped to DGT/VSQ/N0102 : Employability Skills (60 Hours)

| Mandatory Duration: 60:00 |   |   |                  |
|---------------------------|---|---|------------------|
| Location: On-Site         |   |   |                  |
| S.No.                     | Module Name                                 | Key Learning Outcomes   | Duration (hours) |
| 1.                        | Introduction to Employability Skills        | <ul style="list-style-type: none"> <li>Discuss the Employability Skills required for jobs in various industries.</li> <li>List different learning and employability related GOI and private portals and their usage.</li> </ul>   | 1.5              |
| 2.                        | Constitutional values - Citizenship         | <ul style="list-style-type: none"> <li>Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen.</li> <li>Show how to practice different environmentally sustainable practices.</li> </ul>   | 1.5              |
| 3.                        | Becoming a Professional in the 21st Century | <ul style="list-style-type: none"> <li>Discuss importance of relevant 21st century skills.</li> <li>Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.</li> <li>Describe the benefits of continuous learning.</li> </ul> | 2.5              |
| 4.                        | Basic English Skills                        | <ul style="list-style-type: none"> <li>Show how to use basic English sentences for every day conversation in different contexts, in person and over the telephone.</li> <li>Read and interpret text written in basic English</li> <li>Write a short note/paragraph / letter/e -mail using basic English.</li> </ul>   | 10               |
| 5.                        | Career Development & Goal Setting           | <ul style="list-style-type: none"> <li>Create a career development plan with well-defined short- and long-term goals.</li> </ul>  | 2                |
| 6.                        | Communication Skills                        | <ul style="list-style-type: none"> <li>Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.</li> <li>Explain the importance of active listening for effective communication.</li> <li>Discuss the significance of working collaboratively with others in a team.</li> </ul>   | 5                |
| 7.                        | Diversity & Inclusion                       | <ul style="list-style-type: none"> <li>Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD.</li> <li>Discuss the significance of escalating sexual harassment issues as per POSH act.</li> </ul>   | 2.5              |
| 8.                        | Financial and Legal Literacy                | <ul style="list-style-type: none"> <li>Outline the importance of selecting the right financial institution, product, and service.</li> <li>Demonstrate how to carry out offline and online financial transactions, safely and securely.</li> </ul>  | 5                |

|     |   |   |    |
|-----|---|---|----|
|     |   | <ul style="list-style-type: none"> <li>List the common components of salary and compute income, expenditure, taxes, investments etc.</li> <li>Discuss the legal rights, laws, and aids.</li> </ul>  |    |
| 9.  | Essential Digital Skills                | <ul style="list-style-type: none"> <li>Describe the role of digital technology in today's life.</li> <li>Demonstrate how to operate digital devices and use the associated applications and features, safely and securely.</li> <li>Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely.</li> <li>Create sample word documents, excel sheets and presentations using basic features.</li> <li>Utilize virtual collaboration tools to work effectively.</li> </ul> | 10 |
| 10. | Entrepreneurship                        | <ul style="list-style-type: none"> <li>Explain the types of entrepreneurship and enterprises.</li> <li>Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan.</li> <li>Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement.</li> <li>Create a sample business plan, for the selected business opportunity.</li> </ul>  | 7  |
| 11  | Customer Service                        | <ul style="list-style-type: none"> <li>Describe the significance of analyzing different types and needs of customers.</li> <li>Explain the significance of identifying customer needs and responding to them in a professional manner.</li> <li>Discuss the significance of maintaining hygiene and dressing appropriately.</li> </ul>  | 5  |
| 12  | Getting Ready for Apprenticeship & Jobs | <ul style="list-style-type: none"> <li>Create a professional Curriculum Vitae (CV).</li> <li>Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively.</li> <li>Discuss the significance of maintaining hygiene and confidence during an interview.</li> <li>Perform a mock interview.</li> <li>List the steps for searching and registering for apprenticeship opportunities.</li> </ul>   | 8  |



| LIST OF TOOLS & EQUIPMENT FOR EMPLOYABILITY SKILLS |   |             |
|--|---|-------------|
| S No.  | Name of the Equipment   | Quantity    |
| 1.   | Computer (PC) with latest configurations - and Internet connection with standard operating system and standard word processor and worksheet software (Licensed) (all software should either be latest version or one/two version below) | As required |
| 2.   | UPS   | As required |
| 3.   | Scanner cum Printer   | As required |
| 4.   | Computer Tables   | As required |
| 5.   | Computer Chairs   | As required |
| 6.   | LCD Projector   | As required |
| 7.   | White Board 1200mm x 900mm  | As required |

*Note: Above Tools & Equipment not required, if Computer LAB is available in the institute.*

**Mandatory Duration: 90:00**

**Module Name: On-the-Job Training 90 hours**

**Location: On Site**

**Terminal Outcomes**

- Orientation to different departments in Hospital
- Identify different types of medical instruments and equipment and its components, circuit, cables, connectors, PCB, etc. and the tool kit to be used for its repair and maintenance
- Clinical use and principle of operation of different types and models of basic clinical equipment.
- Hands-on experience in installation, set-up, operation, routine maintenance, internal components and functional verification testing, and demonstration of Cleaning and safety measures, Features and Setup of equipment's and its routine use to hospital staff
- Information to hospital staff about use of equipment with respect to risk factor associated with the use of equipment, complexity, manufacturer's instruction and specification, effective use of instruments.
- Demonstration of documentation and recording of equipments to hospital staff with data entry as per protocols: reading of instrument/equipment, recording and record maintenance
- Follow self and scene safety measures while responding to an emergency
- Demonstrate skills of coordination with local emergency agencies and bystanders for help during an emergency situation.
- Demonstrate Cardio Pulmonary Resuscitation (CPR).
- Demonstrate handling of waste through its segregation in different coloured dustbin.
- Demonstrate spillage management with 1% hypochlorite solution.

## Annexure

### Trainer Requirements

| Trainer Prerequisites             |                             |                              |                |                     |                |         |
|-----------------------------------|-----------------------------|------------------------------|----------------|---------------------|----------------|---------|
| Minimum Educational Qualification | Specialization              | Relevant Industry Experience |                | Training Experience |                | Remarks |
|                                   |                             | Years                        | Specialization | Years               | Specialization |         |
| Graduate                          | Bio-medical Engineer        | 1                            |                | 1                   |                |         |
| Graduate                          | Bio-medical Instrumentation | 2                            |                | 1                   |                |         |

| Trainer Certification  |  |
|--|--|
| Domain Certification   | Platform Certification   |
| Certified for Job Role: "Medical Equipment Assistant (Basic Clinical Equipment)" mapped to QP: "HSS/Q5601 v3.0" with minimum score of 80%. | Recommended that the Trainer is certified for the Job Role: "Trainer (VET and Skills)", mapped to the Qualification Pack: "MEP/Q2601, v2.0" with minimum score of 80%. |

| Assessor Prerequisites            |                             |                              |                |                                |                |         |
|-----------------------------------|-----------------------------|------------------------------|----------------|--------------------------------|----------------|---------|
| Minimum Educational Qualification | Specialization              | Relevant Industry Experience |                | Training/Assessment Experience |                | Remarks |
|                                   |                             | Years                        | Specialization | Years                          | Specialization |         |
| Graduate                          | Bio-medical Engineer        | 2                            |                | 1                              |                |         |
| Graduate                          | Bio-medical Instrumentation | 3                            |                | 1                              |                |         |

| Assessor Certification   |  |
|--|--|
| Domain Certification   | Platform Certification   |
| Certified for Job Role: “Medical Equipment Assistant (Basic Clinical Equipment)” mapped to QP: “HSS/Q5601 v3.0” with minimum score of 80%. | Recommended that the Assessor is certified for the Job Role: “Assessor (VET and Skills)”, mapped to the Qualification Pack: “MEP/Q2701, v2.0” with minimum score of 80%. |

## Assessment Strategy

The emphasis is on 'learning-by-doing' and practical demonstration of skills and knowledge based on the performance criteria. Accordingly, assessment criteria for each job role is set and made available in qualification pack.

The assessment papers for both theory and practical would be developed by Subject Matter Experts (SME) hired by Healthcare Sector Skill Council or with the HSSC accredited Assessment Agency as per the assessment criteria mentioned in the Qualification Pack. The assessments papers would also be checked for the various outcome-based parameters such as quality, time taken, precision, tools and equipment requirement etc.

Each NOS in the Qualification Pack (QP) is assigned a relative weightage for assessment based on the criticality of the NOS. Therein each Element/Performance Criteria in the NOS is assigned marks on relative importance, criticality of function and training infrastructure.

The following tools would be used for final assessment:

**1. Practical Assessment:** This comprises of a creation of mock environment in the skill lab which is equipped with all equipment required for the qualification pack.

Candidate's soft skills, communication, aptitude, safety consciousness, quality consciousness etc. is ascertained by observation and marked in observation checklist. The outcome is measured against the specified dimensions and standards to gauge the level of their skill achievements.

**2. Viva/Structured Interview:** This tool is used to assess the conceptual understanding and the behavioral aspects with regard to the job role and the specific task at hand. It also includes questions on safety, quality, environment and equipment etc.

**3. On-Job Training:** OJT would be evaluated based on standard log book capturing departments worked on, key observations of learner, feedback and remarks of supervisor or mentor.

**4. Written Test:** Question paper consisting of 100 MCQs (Hard:40, Medium:30 and Easy: 30) with questions from each element of each NOS. The written assessment paper is comprised of following types of questions:

- i. True / False Statements
- ii. Multiple Choice Questions
- iii. Matching Type Questions.
- iv. Fill in the blanks
- v. Scenario based Questions
- vi. Identification Questions

### QA Regarding Assessors:

Assessors are selected as per the "eligibility criteria" laid down by HSSC for assessing each job role. The assessors selected by Assessment Agencies are scrutinized and made to undergo training and introduction to HSSC Assessment Framework, competency-based assessments, assessors guide etc. HSSC conducts "Training of Assessors" program from time to time for each job role and sensitize

assessors regarding assessment process and strategy which is outlined on following mandatory parameters:

- 1) Guidance regarding NSQF
- 2) Qualification Pack Structure
- 3) Guidance for the assessor to conduct theory, practical and viva assessments
- 4) Guidance for trainees to be given by assessor before the start of the assessments.
- 5) Guidance on assessments process, practical brief with steps of operations practical observation checklist and mark sheet
- 6) Viva guidance for uniformity and consistency across the batch.
- 7) Mock assessments
- 8) Sample question paper and practical demonstration

## References

## Glossary

| Term                         | Description   |
|------------------------------|---|
| <b>Declarative Knowledge</b> | Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.   |
| <b>Key Learning Outcome</b>  | Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application). |
| <b>OJT (M)</b>               | On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site  |
| <b>OJT (R)</b>               | On-the-job training (Recommended); trainees are recommended the specified hours of training on site   |
| <b>Procedural Knowledge</b>  | Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.  |
| <b>Training Outcome</b>      | Training outcome is a statement of what a learner will know, understand and be able to do <b>upon the completion of the training</b> .  |
| <b>Terminal Outcome</b>      | Terminal outcome is a statement of what a learner will know, understand and be able to do <b>upon the completion of a module</b> . A set of terminal outcomes help to achieve the training outcome.   |

## Acronyms and Abbreviations

| Term | Description                             |
|------|---|
| QP   | Qualification Pack                      |
| NSQF | National Skills Qualification Framework |
| NSQC | National Skills Qualification Committee |
| NOS  | National Occupational Standards         |
| CPR  | Cardio-pulmonary Resuscitation          |
| PPE  | Personal Protective Equipment           |