Annexure –I

Detailed Curriculum

Name of Unit of Qualification	**Basic Concept of Electronics and Electronic Components**
Duration	**60 Hrs.**

Outcome	**Contents**	**Hrs.**
Acquire the knowledge of the Fundamentals of Electronics	Fundamentals of Electricity, Voltage and Current, Power Supplies and Simple Circuits, Resistor Circuits and Ohms Law, Resistor Networks, Capacitor Circuits, Fundamentals of Magnetism, Inductor Circuits, Building Electronic Circuits.	**15**
Acquire the knowledge of various Electronic /Electro-mechanical components	Understanding of various Electronic /Electro-mechanical components and its specifications, Active components, Passive Components, Switches, Plugs, Sockets, Panel controls, Integrated Circuits, Pin identification and numbering convention.	**20**
Acquire the knowledge of handling various components	IC handling and installation, Electrostatic Discharge (ESD) Protection. Use of Component testers for validation: Multimeters, Non-polar Capacitor (electrolytic), "Open" Resistor – damaged, Opto-couplers, Piezo Diaphragms, Piezo Buzzers,Spark Gaps,Super Probe MkII, Surface Mount – Packs, Transformers,Voltage Regulators, Voltages on a circuit, Yokes, Audio Stages, Batteries – testing, Burnt Resistor, Cells - batteries, Co-	**15**

	Ax Cables,Coils	
Acquire the knowledge of Materials, Inventory management & records.	Electronics Components handling Electronic stores management as per environmental conditions Maintenance of official records Bill of Materials Inventory management	**10**

Name of Unit of Qualification	**PCB Design and Soldering Techniques**
Duration	**30 Hrs.**

Outcome	**Contents**	**Hrs.**
The basics of PCB and its layout	PCB types: Single-Sided, Double-Sided, Multi-Layered. Overview of PCB Design, Guidelines and General Considerations for PCB Layout	**10**
Acquire the knowledge of the printed circuit board design	PCB Design: Circuit Complexity, Available Space & Cost Process of Making PCB Boards Demystified, Basic Circuit Development on Software, Designing the Circuit PCB Routing.	**10**

Understand the Soldering and De-Soldering techniques	Introduction to Soldering and De-Soldering, wetting of solders, Flux and its properties, Automatic Soldering, Solder Application, Automatic Removal of Solder Bridges: Hot Air-Jet Knives, Special Considerations on SMT Boards.	**10**

Name of Unit of Qualification	**Electronic Sub Assembly**
Duration	**30 Hrs.**

Outcome	**Contents**	**Hrs.**
Understand the Wire Crimping and Wire Bunching	Wire Crimping: Cutting, Stripping, Fixing Lugs, Crimping, Understanding battery connections, Wire Bunching: Crimping, Twisting, Bunching, Crimping of wire terminals and fixing connectors.	**10**
Understand the basics of PCB Components and Stuffing	Wire Harnessing Component Formation for PCB: Stuffing of components onto PCB, Soldering of components on to PCB	**10**
Acquire the knowledge of sub-assemblies	Soldering of components on to PCB, De-soldering, Doing Quality check Introduction of Sub-assemblies like control panel, LED/LCD display and integration etc. with Electronic boards	**10**

Name of Unit of Qualification	**Integrated testing**
Duration	**20 Hrs.**

Outcome	**Contents**	**Hrs.**

Acquire the knowledge of Design requirement and testing instruments	Introduction to Test and Measurement Instruments (Power supply, Signal generator, Multimeter, CRO, DSO) Design requirement Review Visual Inspection Power-up test	**10**
Understand the basics of automated testing technologies	Introduction to Automated Testing Technologies. Functional testing Calibration Performance testing Environmental testing	**10**

Name of Unit of Qualification	**Manufacturing Techniques**
Duration	**20 Hrs.**

Outcome	**Contents**	**Hrs.**
Acquire the knowledge of PCB manufacturing process and inspection techniques	PCB Manufacturing Process: Artwork, Photo Printing, Screen Printing, Plating, Etching, Emerging PCB Technology Trends. Overview of Design rules for Analog circuit PCB, Digital circuit PCB, Power circuit PCB, Application of Heat Sink concepts. PCB inspection: Inspection techniques, equipment and principle - AOI, X-ray. Defects and Corrective action - stencil printing process, component placement process, reflow soldering process, under-fill and encapsulation process.	**5**
Understand the basics of SMT process & SMT equipment.	Introduction to SMT Process, SMT equipment and material handling systems, handling of components and assemblies - moisture sensitivity and ESD, safety and precautions needed, IPC and other standards, stencil	

	printing process - solder paste material, storage and handling, stencils and squeegees, process parameters, quality control. Component placement- equipment type, flexibility, accuracy of placement, throughput, Packaging of components for automated assembly, Cp and Cpk and process control. soldering- reflow process, process parameters, profile generation and control, solder joint metallurgy, adhesive, under-fill and encapsulation process - applications, materials, storage and handling, process and parameters.	**15**

Name of Unit of Qualification	**Quality management system**
Duration	**10 Hrs.**

Outcome	**Contents**	**Hrs.**
Acquire the knowledge of quality management	Plan do check act cycle What is QMS Benefits of QMS	**05**
Understand the Elements of international standards	QMS principles Introduction to ISO Elements of ISO 9001	**05**

Name of Unit of Qualification	**Safety Health and Environmental Standards (SHE)**
Duration	**5 Hrs.**

Outcome	**Contents**	**Hrs.**
Acquire the knowledge of health and environmental standards	What is EHS? Importance of EHS Environment Impact and aspect with case studies Introduction to ISO 14001 Risks and hazard identification with case studies Introduction to OHSAS 18001	**05**

Name of Unit of Qualification	**Interpersonal and Communication Skills/Reporting**
Duration	**05 Hrs.**

Outcome	**Contents**	**Hrs.**
Acquire the knowledge of Soft Skills	Communication Skills Technical Writing	**05**