

# **AMIE22 ELECTRONICS MANUFACTURING TECHNOLOGY**

## **UNIT-1 INTRODUCTION TO ELECTRONICS MANUFACTURING**

- 1.1 History, definition, wafer preparation by growing, machining, and polishing, diffusion, microlithography, etching and cleaning,
- 1.2 Printed circuit boards, types- single sided, double sided, multi-layer and flexible printed circuit board, design, materials, manufacturing, inspection.

## **UNIT-2 COMPONENTS AND PACKAGING**

- 2.1 Introduction to packaging, types-Through hole technology(THT) and Surface mount technology(SMT), Through hole components- axial, radial, multi leaded, odd form. Surface-mount components- active, passive.
- 2.2 Interconnections - chip to lead interconnection, die bonding, wire bonding, TAB, flip chip, chip on board, multi-chip module, direct chip array module, leaded, leadless, area array and embedded packaging, miniaturization and trends.

## **UNIT-3 SURFACE MOUNT TECHNOLOGY PROCESS**

- 3.1 Introduction to the SMT Process, SMT equipment and material handling systems, handling of components and assemblies
- 3.2 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.
- 3.3 Component placement- equipment type, flexibility, accuracy of placement, throughput, packaging of components for automated assembly, Cp and Cpk and process control.
- 3.4 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.

## **UNIT-4 INSPECTION AND TESTING**

- 4.1 Inspection techniques, equipment and principle - AOI, X-ray.
- 4.2 Defects and Corrective action - stencil printing process, component placement process, reflow soldering process, underfill and encapsulation process,
- 4.3 Electrical testing of PCB assemblies- In circuit test, functional testing, fixtures and jigs.

## **UNIT-5 REPAIR, REWORK, QUALITY AND RELIABILITY OF ELECTRONICS ASSEMBLIES**

- 5.1 Repair tools, methods, rework criteria and process, thermo-mechanical effects and thermal management, Reliability fundamentals, reliability testing, failure analysis,
- 5.2 Design for manufacturability, assembly, reworkability, testing, reliability, and environment.

### **Reference Book:**

1. Failure Modes and Mechanisms in Electronic Packages, Puligandla Viswanadham and Pratap Singh, Chapman and Hall, New York , N.Y. ISBN 0-412-105591-8.