SUBJECT NO-ME60306, SUBJECT NAME- PRECISION AND MICRO MANUFACTURING

LTP- 3-0-0,CRD- 3

SYLLABUS :-

INTRODUCTION: basic definition, size scales, scaling analysis, technology change, Lithographic Processes- Optical and X-ray.
PRECISION ENGINEERING AND PRACTICES: Definitions, Sources Of Error, Basic Concepts Of Machining, Machine Tool Variables- accuracy, stiffness, spindle vibration, flatness, straightness, and smoothness of motion, 1-2 DOF systems, Feedback Variables, Cutting Tool Variables, Workpiece Variables, Environment Effects and Thermal Errors.
INTRODUCTION TO MACHINING ANALYSIS: geometry of Cutting Edge, Energy Models, Comparison with Micro-scale Machining.
DIAMOND MICROMACHINING: Introduction, Diamond as a Tool Material, Compatible Materials, Diamond Performance, Diamond Machining, Micro-mechanical Applications,
Diamond Machining as a Micro-mechanical Process Research Method, Ductile Regime Grinding
MICRO-ECM, MICRO-EDM etc.
MICROMILLING: Micro-milling Tools, Process Results and Micro-milling Applications- micro-mechanically milled X-ray masks, micro-milled mask materials, Mask Absorption Quantification, Exposure Quantification.
MICRODRILLING: Micro-drilling and Macro-drilling Techniques.
LASER MICROMACHINING: laser Optics, Laser Ablation, Heat Affected Zone and Laser Polymerisation.
LIGA, S-LIGA
Micro welding: Micro welding in similar and dissimilar materials; welding processes like ultrasonic, EB, LB; applications.
Micro casting: Casting processes like vacuum, semi-solid state; applications
Processing of Integrated Circuits, Clean rooms, crystal growing and shaping of wafers, Etching, Photo and other lithography techniques, Impurity introduction, Thermal oxidation, CVD, Metallisation etc. IC packaging