Gautam Buddha University, Greater Noida

School of Engineering (Mechanical Engineering)

Degree	Course Name	Course Code	Marks:100
M. Tech.	Precision Engineering	MEM 515	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
I	3	3-0-0	3 Hours

Unit - I

Concepts of Accuracy: Introduction; Concept of Accuracy of Machine Tools-Spindle and Displacement Accuracies; Accuracy of numerical control systems; Errors due to numerical interpolation, Displacement measurement system and velocity lags. **(06 Hours)**

Unit – II

Geometric Dimensioning And Tolerancing: Tolerance zone conversion-surfaces; Features; Features of size; Datum features-datum oddly configured and curved surfaces as datum features; Equalizing datums; Datum feature of representation-form controls; Orientation controls; Logical approach to tolerancing. **(06 Hours)**

Unit - III

Datum Systems: Design of freedom; Grouped datum systems-different types; Two and three mutually perpendicular grouped datum planes; Grouped datum system with spigot and recess; pin and hole; Grouped datum system with spigot and recess pair and tongue – slot pair – Computation of transnational and rotational accuracy; Geometric analysis and application. **(09 Hours)**

Unit - IV

Tolerance Analysis: Process capability; Mean; Variance; Skewness; Kurtosis; Process capability metrics; Cp; Cpk; Cost aspects; Feature tolerances; Geometric tolerances.

Surface Finish: Review of relationship between attainable tolerance grades and different machining process; Cumulative effect of tolerances sure fit law; Normal law and truncated normal law. **(08 Hours)**

Unit - V

Tolerance Charting Techniques: Operation sequence for typical shaft type of components; Preparation of process drawings for different operations; Tolerance worksheets and centrally analysis; Examples; Design features to facilitate machining; Datum Features – functional and manufacturing; Components design –Machining considerations; Redesign for manufactured; Examples. **(08 Hours)**

Unit - VI

Fundamentals of Nanotechnology: System of nanometer accuracies; Mechanism of metal Processing; Nano physical processing of atomic bit units; Nanotechnology and electrochemical atomic bit processing.

Measuring Systems Processing: In processing or in-situ measurement of position of processing point- Post process and on–machine measurement of dimensional features and surface– mechanical and optical measuring systems.

(08 Hours)

Recommended Books:

1. Precision Engineering in Manufacturing; R. L. Murthy; New Age International (P) limited; 1996.
2. Geometric Dimensioning and Tolerancing; D. Meadows James; Marcel Dekker Inc. 1995.
3. Nano Technology; Norio Taniguchi; Oxford University Press; 1996
4. Engineering Design – A systematic Approach; Matousek; Blackie and son Ltd. London.