GEOMETRIC DIMENSIONING AND TOLERANCING

Course Code	19ME4801B	Year	IV	Semester	II
Course Category	Program Elective-VI	Branch	ME	Course Type	Theory
Credits	3	L – T – P	3 – 0 – 0	Prerequisites	Nil
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes		Level
After successful completion of the course, the student will be able to		
CO1	Interpret Geometric Dimensioning Tolerance symbols on a print	L2
CO2	Identify basic principles of Tolerancing	L2
CO3	Set up and use basic rectangular datum reference frames	L2
CO4	Understand procedure followed for indicating form and Profile tolerances with applied material conditions	L2

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3-High, 2: Medium, 1: Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	3				1	1	2		2	3	1
CO2	3		3	3				1	1	2		1	3	1
CO3	3		3	3				1	1	2		1	3	1
CO4	3	2	3	3				1	1	2		2	3	1

Syllabus		
Unit No.	Contents	Mapped COs
I	**Introduction:** Scope, Definitions, Fundamental Rules, Units of Measure, Types of Dimensioning, Application of Dimensions, Dimensioning Features, Location of Features **Symbology:** Use of Notes to Supplement Symbols, Symbol Construction, Feature Control Frame Symbols, Feature Control Placement, Definition of Tolerance Zone, Tabulated Tolerances	CO 1
II	**Principles of Tolerancing:** Direct Tolerancing Methods, Tolerance Expression, Interpretation of Limits, Single Limits, Tolerance Accumulation, Limits of Size, Applicability of Modifiers on Geometric Tolerance Values and Datum Feature References, Screw Methods, Gears and Splines, Boundary Conditions, Angular Surfaces, Conical Tapers, Flat Tapers, Radius, Tangent Plane, Statistical Tolerancing.	CO 2
III	**Datum Reference Frames:** Degrees of Freedom, Degrees of Freedom Constrained by Primary Datum Features, Regardless of Material Boundary, Constraining Degrees of Freedom of a Part, Datum Feature Simulator, Theoretical and Physical Application of Datum Feature Simulators, Datum Reference Frame, Datum Features and Controls, Specifying Datum Features in an Order of Precedence, Establishing	CO 3

	Datums, Multiple Datum Features, Mathematically Defined Surface, Multiple Datum reference Frames, Functional Datum Features, Rotational Constraint about a Datum Axis or Point, Application of MMB, LMB and RMB to Irregular Features of Size, Datum Feature Selection Practical Applications, Simultaneous Requirements, Restrained Condition, Datum Reference Frame Identification, Customized Datum Reference Frame Construction, Application of a Customized Datum Reference Frame, Datum Targets	
IV	**Form Tolerances:** Form Control, Specifying Form Tolerances, Application of Free-State Symbol Orientation Tolerances: Orientation Control, Orientation Symbols, Specifying Orientation Tolerances, Tangent Plane, Alternative Practice **Location Tolerances:** Positional Tolerancing, Positional Tolerancing Fundamentals – I and II, Pattern Location, Coaxial Feature Controls, Tolerancing for Symmetrical Relationships	CO 4
V	**Profile Tolerances:** Profile, Tolerance Zone Boundaries, Profile Applications, Material Condition and Boundary Condition Modifiers as **Composite Profile,** Multiple Single-Segment Profile Tolerancing, Combined Controls **Runout Tolerances:** Runout, Runout Tolerance, types of Runout Tolerances, Applications, Specification.	CO 4

Learning Recourse(s)

Text Book(s)

1. Geometric Dimensioning and Tolerancing by P.S. Gill, (Publ.) S. K. Kataria & Sons

Reference Book(s)

1. . Geometric Dimensioning and Tolerancing: Applications and Techniques for Use in Design: Manufacturing, and Inspection, by James D. Meadows, CRC Press, 1995
2. Simplified GD & T: Based on ASME-Y 14.5-2009 by Ashok Kumar 2nd Edition, Azuko Publishing **2009**