10 ME 415 TOOL DESIGN

IV B.Tech I Semester

(with effect from the academic year 2013-2014)

Credits: 4

Lectures/week:4 Hrs. *Sessional Marks: 40*

University Exam:3 Hrs *End Examination Marks: 60*

UNIT –I

Cutting Tools Classification – Nomenclature of single point cutting tool – Difference between orthogonal and oblique cutting – Mechanism of metal cutting – Types of chips – chip breakers – Forces acting on a tool – Merchant circle diagram – Velocity relations – specific energy in cutting.

UNIT-II

Tool Wear – Tool life – Factors affecting tool life – Taylor's Tool life Equation – Tool wear mechanisms – Types of tool wear – Heat distribution in metal cutting – Measurement of temperature in metal cutting. Lathe tool Dynamometer. Cutting fluids – Selection and applications.

UNIT-III

Cutting Tool Materials- Requirements of tool materials, advances in tool materials, HSS, Coated HSS, Carbides ,Coated Carbides, Ceramics, Cold pressed, Hot Pressed , Ceramic Composites, CBN, Diamond- properties, Advantages and Limitations, Specifications for Inserts and tool holders. Design of single point cutting tool shanks and form tools for Lathe work- Design of Milling and Broach tools.

UNIT- IV

Economics of Machining: Costs associated with machining operations- Optimum cutting speed for minimum cost and maximum production, cutting speed for minimum cost in Turning.

Press Working : Press working operations- Press selection and Tonnage- Centre of Pressure- Cutting forces and clearances for Die Design – Compound and Progressive Die, Strip layout.

UNIT-V

Jigs & Fixtures- Uses- Locating devices, 3-2-1 principle of location – pin location- Radial location- 'V' location- Diamond locators. Types of clamping devices- principles of clamping. Design principles to Jigs & Fixtures – Drill Jigs, types- Drill Bushes, types- Fixtures for Turning, Milling and Welding.

TEXT BOOKS:

1. Fundamental of Tool Design : ASTME
2. A Text Book of Production Engineering : P.C. Sharma

REFERENCES:

1. Fundamental of Metal Cutting and Machine Tools (New Age International Publishers) : Juneja and Sekhan
2. Metal Cutting Principles (Oxford University Press) : Milton C.Shaw
3. Jigs and Fixtures : Kempster