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| Lesson plan for 2019-20 | | | |
| Week | Topics to be covered | Planned week | Actual week |
| 1 | Design of single point cutting tools: Different systems of tool nomenclature like MRS, ORS and NRS. | (6 Jan to 10 Jan) |  |
| 2 | Properties of cutting tool materials. Major tool material types. Plain carbon steel, high speed steel, cast alloys, cemented tungsten carbide, Titanium carbides, ceramic and cermet tools, synthetic diamond, polycrystalline diamond (PCD), cubic boron nitride (CBN), coated tools. | (13 Jan to 17 Jan |  |
| 3 | Mechanics of orthogonal steady state metal cutting, shear plane and shear plane angle, various types of chips, | (20 Jan to 24 Jan |  |
| 4 | Merchant's Concept of specific power consumption in machining. theory & modified theory of metal cutting. Numericals | (27 Jan to 31 Jan) |  |
| 5 | Interrelationship among different systems of nomenclature for tool angles. | (3 Feb to 7 Feb) |  |
| 6 | Definition, flank wear and crater wear, criteria for tool failure, Components of product cost.  Effect of cutting parameters and tool geometry on tool life. Taylor's tool life equation  Experimental methods to find Taylor exponents.  Optimum cutting velocity for minimum cost of production  Optimum cutting velocity for maximum production rate. | (10 Feb to 14 Feb) |  |
| 8 | Constructional features of solid tool, tipped tools, mechanically held regrind able insert type tools and throw away tip type tools. Design of shanks, cutting tip and chip breakers for HSS and Carbide tools. ISO coding system for tipped tools and tool holders. | (24 Feb to 28 Feb) |  |
| 9 | Design of Form Tools and broaches: Various types such as flat form tool, tangential form tool, circular form tool, constructional details and fields of application. Profile design of flat and circular form tools Profile design of flat and circular form tools. | (2 March to 6 March) |  |
| 10 | Broach nomenclature, design steps for circular pull type,  Broach nomenclature, design steps for circular pull type,  key way and spline broaches. | (9 March to 13 March) |  |
| 11 | Measurement and specification of surface finish, primary cutting edge finish, fracture roughness, BUE formation and its influence on finish, secondary cutting edge finish, geometrical contribution to roughness, edge finishing and residual stress. | (16 March to 20 March) |  |
| 12 | Dynamometer requirements, force measurement, electric transducers, strain gage lathe dynamometer, strain rings,  Milling dynamometer, drilling dynamometer, surface grinding dynamometer, piezoelectric dynamometry.  Function of coolant, types of coolants, choice of coolants for various machining processes. Vapors and mist, cryogenic cooling and dry machining. | (23 March to 27 March) |  |
| 13 | Heat generation in metal cutting, heat transfer in a moving material, Temperature distribution in metal cutting,  temperature in primary deformation zone, temperature in secondary deformation zone,  Effect of cutting speed on temperature  prediction of temperature distribution in machining  radiation methods, hardness and  microstructure changes in steel tools.  Measurement of cutting temperature, work-tool thermocouple, direct thermocouple measurement,  radiation methods, hardness and microstructure changes in steel tools. | (30 March to 3 April) |  |
| 14 | Design of gear milling cutters: Types of gear milling cutters, standard set of cutters, limitations on accuracy  Design of form disc type,  End mill type  Gear hobbing cutters | (6 April to 10 April) |  |