**Lesson Plan**

**Name of faculty: AMIT GUPTA**

**Discipline: Mechanical**

**Semester: 4th**

**Subject: Production Technology -1**

Lesson Plan Duration: 15 weeks (from January, 2018 to April, 2018)

|  |  |  |
| --- | --- | --- |
| **Week** | **Theory** | **Practical** |
|  | **Lecture day** | **Topic(Including assignment/ test)** | **Practical day** | **Topic** |
| 1st |  | **Chapter 1: Geometry of Cutting Tools:** Introduction  |  | Practice of slab milling on milling machine.  |
|  | Geometry of single point turning tools: Cutting edges, Rake and Clearance angles |
|  | Systems of description of tool geometry Designation of tool geometry in Machine reference system, ORS system and NRS system |
| 2nd |  | Geometry of Multi point cutting tools: Geometry of Milling Cutters |  | Practice of slotting on milling machine |
|  | Geometry of Drills |
|  | **Chapter 2: Mechanics of Metal cutting:** Cutting Tool Materials, Chip formation |
| 3rd |  | Types of Chips, Chip control and chip breakers |  | Checking of files and Viva Voce and remedial measures regarding the practical performed ( If any) |
|  | Orthogonal and oblique metal cutting, Chip thickness ratio, Velocity relationship in orthogonal cutting, |
|  | Merchant’s Analysis, Stress and Strain on the chip |
| 4th |  | Forces on single point cutting tool, Torque, heat produced, power and MRR equations |  | To cut gear teeth on milling machine using dividing head |
|  | Use of Merchant’s circle diagram in force analysis in orthogonal cutting for single point cutting tool. |
|  | Popular theories on mechanics of metal cutting: Earnst Merchant Theory, Merchant theory, Stabler Theory |
| 5th |  | Lee and Shaffer’s Theory. Factors affecting temperature in metal cutting |  | Introduction to various grinding wheels and demonstration on the surface grinder |
|  | **Chapter 3 : Cutting Fluids and Tool life:** Cutting fluids, Purpose |
|  | Properties, Types of lubricants, Types of cutting fluids |
| 6th |  | Tool Failure, Mechanisms of Tool wear |  | Checking of files and Viva Voce and remedial measures regarding the practical performed ( If any) |
|  | Tool Life, Factors affecting tool life , Taylor’s Tool life equation |
|  | **Chapter 4: Economics of metal machining:** Cost Considerations in Manufacturing |
| 7th |  | Elements of Machining cost, Minimum cost per piece, Maximum Production rate |  | To make a component on lathe machine using copy turning attachment |
|  | Optimum cutting speed and optimum tool life for minimum cost of production and maximum production rate, |
|  | Machinability, Machinability Index, Improving Machinability |
| 8th |  | Measurement of cutting forces, Tool force Dynamometers |  | To cut external threads on a lathe |
|  | Numerical on Mechanics of Metal cutting and economics. |
|  | **Chapter 5 : Milling Process** : Milling Machine Operations performed on Milling machine,  |
| 9th |  | Parts of Milling Machine |  | Checking of files and Viva Voce and remedial measures regarding the practical performed ( If any) |
|  | Types of Milling machines, fundamentals of Milling process |
|  | Milling Cutters, Elements of Plain Milling cutter, Cutter Holing devices |
| 10th |  | Cutting speed , Feed and depth of cut, Force system in Milling  |  | To cut multi slots on a shaper machine |
|  | Dividing head or Indexing Head, Methods of Indexing |
|  | **Chapter 6 : Drilling Machine:** Types of Drills |
| 11th |  | Drilling machine Types, Drilling machine operations |  | To perform drilling and boring operation on a Component. |
|  | Size of Drilling machine, Main parts of drilling machine |
|  | Force system in Drilling, Cutting speed, Feed and Depth of cut in drilling |
| 12th |  | MRR in drilling, Numerical Problems on Drilling |  | Checking of files and Viva Voce and remedial measures regarding the practical performed ( If any) |
|  | **Chapter 7: Specification of Machine Tools:** Introduction, purpose of machine tool specifications:,  |
|  | Methods of specification of conventional machine tools |
| 13th |  | Specification of lathes, specification of drilling and boring machines |  | To carry out welding using TIG/MIG welding set |
|  | Specification of shaper, planer and slotter machines, specification of milling machine |
|  | Specification of gear teeth generating machines, specification of grinding machines. |
| 14th |  | **Chapter 8: Metrology** Measurements, Linear Measurement, Calipers |  | Study the constructional detail and working of CNC lathes Trainer |
|  | Vernier Caliper, Micrometer, Angular Measurement |
|  | Comparators-mechanical, electrical and optical |
| 15th |  | Sine bar, auto-collimator  |  | Checking of files and Viva Voce and remedial measures regarding the practical performed ( If any) |
|  | Surface finish and its measurement, Surface Roughness Measurement methods |
|  | Factors affecting surface finish in machining, micro and macro deviation, specifying surface finish |