

# LESSON PLAN (Summer-2026)

VENUS GROUP OF EDUCATIONAL & RESEARCH INSTITUTES, BAHANAGA, BALASORE-756042

|                                        |                                               |                                                                                             |
|----------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------------|
| <b>Discipline:</b><br>Mechanical Engg. | <b>Semester:</b> 4th                          | <b>Name of the Teaching Faculty:</b> MANORANJAN PATRA                                       |
| <b>Subject:</b> Tool Engineering       | <b>No. of days per week class allotted:</b> 5 | <b>Semester From date:</b> 22.12.2025 <b>To date:</b> 18.04.2026<br><b>No. of Weeks:</b> 15 |
| <b>Week No.</b>                        | <b>Class Day</b>                              | <b>Theory/Practical Topics</b>                                                              |
| <b>1st</b>                             | 1st                                           | Metal Cutting: Mechanics of Metal cutting                                                   |
|                                        | 2nd                                           | <b>Metal Cutting: Mechanics of Metal cutting</b>                                            |
|                                        | 3rd                                           | <b>requirements of tools; cutting forces</b>                                                |
| <b>2nd</b>                             | 1st                                           | types of chips; chip thickness ratio; shear angle ; simple numerical only                   |
|                                        | 2nd                                           | types of chips; chip thickness ratio; shear angle ; simple numerical only                   |
|                                        | 3rd                                           | types of metal cutting process; or- thogonal; oblique and form cutting                      |
| <b>3rd</b>                             | 1st                                           | types of metal cutting process; or- thogonal; oblique and form cutting                      |
|                                        | 2nd                                           | Cutting fluids: types; characteristics and applications                                     |
|                                        | 3rd                                           | Tool wear                                                                                   |
| <b>4th</b>                             | 1st                                           | Types of wear; Tool life; Tool life equations                                               |
|                                        | 2nd                                           | Types of wear; Tool life; Tool life equations                                               |
|                                        | 3rd                                           | Machinability: definition; factors affecting machinability; machinability index             |
| <b>5th</b>                             | 1st                                           | Machinability: definition; factors affecting machinability; machinability index             |
|                                        | 2nd                                           | Tool materials: Types; characteristics; applications                                        |
|                                        | 3rd                                           | Heat treatment of tool steels;                                                              |
| <b>6th</b>                             | 1st                                           | Specification of                                                                            |
|                                        | 2nd                                           | carbide tips                                                                                |
|                                        | 3rd                                           | Types of ceramic coatings                                                                   |

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| <b>7th</b>  | 1st | Cutting Tool Geometry: Single point cutting tool; drills; reamers; milling; cutters                                                         |
|             | 2nd | Cutting Tool Geometry: Single point cutting tool; drills; reamers; milling; cutters                                                         |
|             | 3rd | Types of dies and construction                                                                                                              |
| <b>8th</b>  | 1st | Simple Die; Compound Die; Progressive Die; Combination Die.                                                                                 |
|             | 2nd | Punch & Die mountings: pilots; strippers; misfeed detectors; Pressure Pads; Knock outs; stock guide; Feed-Stop; guide bush; guide pins.     |
|             | 3rd | Punch & Die mountings: pilots; strippers; misfeed detectors; Pressure Pads;                                                                 |
| <b>9th</b>  | 1st | Die Design Fundamentals                                                                                                                     |
|             | 2nd | Die Operations; blanking; piercing; shearing; cropping; notching; lancing; coining; embossing; stamping; curling; drawing; bending; forming |
|             | 3rd | Die Operations; blanking; piercing; shearing; cropping; notching; lancing; coining; embossing; stamping; curling; drawing; bending; forming |
| <b>10th</b> | 1st | Die set; Die shoe; Die area                                                                                                                 |
|             | 2nd | Calculation of clearances on die and punch for blanking and piercing dies                                                                   |
|             | 3rd | Calculation of material utilization factor                                                                                                  |
| <b>11th</b> | 1st | Forming Dies                                                                                                                                |
|             | 2nd | Bending methods; Bending Dies                                                                                                               |
|             | 3rd | bend allowance; spring back; springing;                                                                                                     |
| <b>12th</b> | 1st | bending pressure; pressure pads                                                                                                             |
|             | 2nd | development of blank length                                                                                                                 |
|             | 3rd | Drawing: operations                                                                                                                         |
| <b>13th</b> | 1st | Metal flow during drawing; Calculation of Drawing blank size                                                                                |
|             | 2nd | variables affecting metal flow during drawing;                                                                                              |
|             | 3rd | single action and double action dies; combination dies.                                                                                     |
| <b>14th</b> | 1st | Fundamentals of other Tools                                                                                                                 |
|             | 2nd | Constructional features of - Pressure Die casting dies                                                                                      |
|             | 3rd | metal extrusion dies; injection molding dies                                                                                                |
| <b>15th</b> | 1st | forging dies; plastic extrusion dies                                                                                                        |
|             | 2nd | Revision 1st & 2nd module                                                                                                                   |
|             | 3rd | Revision 3rd, 4th, 5th module                                                                                                               |