LABORATORY PLANNING GUIDE

L20.2 Technical Drawing II Laboratory

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Covered subjects according to the curriculum

Major topics of learning content:
- familiarisation with three-dimensional views
- production-oriented and standardised representation of parts
- surface finish and tolerance specifications
- overview drawing
- parts list
- standard parts
- 3D views
- material specifications
- production-oriented and standardised representation of turned parts: dimensioning, surface finish and tolerance specifications
- drawings of cast parts and their special features: machining allowances, mould drafts, shrinkage, sectional views
- from the cast part to the finished part: production-oriented and standard dimensioning for subsequent machining
- manufacture of cast parts by the sand-casting method
- machine and tool selection, length measurement exercises
- machine elements and their function
- hand-operated tabletop cutaway model for the demonstration of the functionality of
  * a worm gear
  * a mitre gear
  * a spur gear
  * a two-stage spur gear
  * a planetary gear
  * a variable speed belt drive
  * a control gear
  * a multiple-disk clutch
  * an electromagnetic single disk brake
  * a pedestal bearing

Main concept
The laboratory is designed for accommodation of 24 students + 2 laboratory staff:
- 2 - 4 students form a team and work together at a workstation / training system
- 54 experiment sets, in 20 different types
- Easy storage and transportation in a practical case
- Each set is equipped with a manual containing technical information, basic theory, experiment instructions, evaluation help and safety advice.
- Student teams are scheduled to change workstations from lab session to lab session in order to perform the entire range of experiments within the course duration.
- Average time per experiment: 90 to 120 minutes.

2 workstations for laboratory staff (with PC and internet access)
1 printer for common use
1 cupboard for the experiment cases
Initial training provided for laboratory personnel
To be conducted immediately after installation and commissioning of the equipment.
General topics to be covered for any of the educational systems:

- Basic familiarization with the system.
- Functions and components.
- Overall system configuration aspects.
- Start-up and operational aspects.
- Conduction experiments, including evaluation and calculation.
- Using the system with and without the software (where applicable).
- Trouble shooting and maintenance aspects.
- Hands-on, practical familiarization aspects.
- Seminar participants with the delivered system.
- Details of the manuals.
- Safe operation and preventive maintenance.

Requirements / Utilities
Power supply:
- 230 V / 50 Hz / 1 phase – at least 2 power sockets for staff computers.
Laboratory computer network:
- 2 internet connections for staff
Location:
- Laboratory space min 60 m²
- This laboratory could be installed on any floor (e.g. ground floor or 1st floor)
**Schedule of requirements**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item 1</td>
<td>Bending device</td>
<td>6 pcs.</td>
</tr>
<tr>
<td>Item 2</td>
<td>Engineering drawing: casting</td>
<td>6 pcs.</td>
</tr>
<tr>
<td>Item 3</td>
<td>Drilling jig for a casting</td>
<td>4 pcs.</td>
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<tr>
<td>Item 4</td>
<td>Drilling jig for an annular disc</td>
<td>4 pcs.</td>
</tr>
<tr>
<td>Item 5</td>
<td>Lever shears</td>
<td>4 pcs.</td>
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<tr>
<td>Item 6</td>
<td>Engineering drawing: safety catch</td>
<td>4 pcs.</td>
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<tr>
<td>Item 7</td>
<td>Drilling jig for flat part</td>
<td>4 pcs.</td>
</tr>
<tr>
<td>Item 8</td>
<td>Assembly of bending device</td>
<td>4 pcs.</td>
</tr>
<tr>
<td>Item 9</td>
<td>Engineering drawing: rotationally symmetrical components</td>
<td>4 pcs.</td>
</tr>
<tr>
<td>Item 10</td>
<td>Assembly of lever shears</td>
<td>4 pcs.</td>
</tr>
<tr>
<td>Item 11</td>
<td>Cutaway model: worm gear</td>
<td>1 pcs.</td>
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<tr>
<td>Item 12</td>
<td>Cutaway model: mitre gear</td>
<td>1 pcs.</td>
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<tr>
<td>Item 13</td>
<td>Cutaway model: spur gear</td>
<td>1 pcs.</td>
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<tr>
<td>Item 14</td>
<td>Cutaway model: two-stage spur gear</td>
<td>1 pcs.</td>
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<tr>
<td>Item 15</td>
<td>Cutaway model: planetary gear</td>
<td>1 pcs.</td>
</tr>
<tr>
<td>Item 16</td>
<td>Cutaway model: variable speed belt drive</td>
<td>1 pcs.</td>
</tr>
<tr>
<td>Item 17</td>
<td>Cutaway model: control gear</td>
<td>1 pcs.</td>
</tr>
<tr>
<td>Item 18</td>
<td>Cutaway model: multiple-disc clutch</td>
<td>1 pcs.</td>
</tr>
<tr>
<td>Item 19</td>
<td>Cutaway model electromagnetic single disk brake</td>
<td>1 pcs.</td>
</tr>
<tr>
<td>Item 20</td>
<td>Cutaway model: pedestal bearing</td>
<td>1 pcs.</td>
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</tbody>
</table>
Laboratory drawing