LABORATORY PLANNING GUIDE

L21 Metrology & Measurement Laboratory

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Covered subjects according to the curriculum

Major topics of learning content:

- familiarisation with three-dimensional views as the basis of technical drawing
- step-by-step development of three-dimensional visualisation
- measurement exercises:
  - outer dimensions
  - inner dimensions
  - depths
  - angles
  - lengths
  - radii
  - parallelism
  - internal and external tapers
- exercises in production-oriented and standard dimensioning
- systematic familiarisation with a wide range of features on
  - cylindrical base forms
  - prismatic base forms
- familiarisation with
  - steel ruler
  - vernier caliper gauge
  - depth caliper gauge
  - external micrometer
  - depth micrometer
  - inside spring caliper as gauge
  - block gauge
  - taper ring gauge
- three-plane views
  - plane views
  - surface finish and tolerance specifications
  - parts lists
  - material specifications
- planning and execution of simple assembly operations:
  - planning and describing work sequences
  - assessing results
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
- 24 experiment sets, in 12 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>Engineering drawing: three-dimensional display</td>
<td>2 pcs.</td>
</tr>
<tr>
<td>Item 2</td>
<td>Assembly of bending device</td>
<td>2 pcs.</td>
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<tr>
<td>Item 3</td>
<td>Assembly of lever shears</td>
<td>2 pcs.</td>
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<tr>
<td>Item 4</td>
<td>Assembly of lever press</td>
<td>2 pcs.</td>
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<tr>
<td>Item 5</td>
<td>Dimensional metrology I: training kit 1</td>
<td>2 pcs.</td>
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<tr>
<td>Item 6</td>
<td>Dimensional metrology I: training kit 2</td>
<td>2 pcs.</td>
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<tr>
<td>Item 7</td>
<td>Dimensional metrology I: training kit 3</td>
<td>2 pcs.</td>
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<tr>
<td>Item 8</td>
<td>Dimensional metrology I: training kit 4</td>
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<tr>
<td>Item 9</td>
<td>Dimensional metrology I: training kit 5</td>
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<tr>
<td>Item 10</td>
<td>Dimensional metrology I: training kit 6</td>
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<tr>
<td>Item 11</td>
<td>Dimensional metrology II: training kit 1</td>
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<tr>
<td>Item 12</td>
<td>Dimensional metrology II: training kit 2</td>
<td>2 pcs.</td>
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</tbody>
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