Measurement of illuminance

Objective:
Measure illuminance at selected locations in the classroom.

Tasks:
1. Measure illuminance under different illuminance conditions at different locations in the classroom.
2. Compare the obtained results with recommended values of illuminance for different types of premises.
3. Explain obtained results. Relative positions of light sources and illuminated area must be taken into consideration.

Recommended tools and devices:
luxmeter, measuring tape, ultrasonic distance meter

Procedure:
1. Work alone.
2. Prepare the luxmeter for measurement (fig. 1).
   a) Before starting the measurement, the probe should be exposed to the room illuminance for approximately 5 minutes, in order to exclude changes in sensitivity and damage of photocells after prolonged storage in dark enclosure.
   b) Before connecting the probe to the luxmeter, set the switch to 0 (left-most end of the scale - PU 150) or to the OFF position (MS-1300).
3. Set the measurement range to the highest range (PU 150: 5000 lx; MS-1300: 50000 lx). If the value of illuminance is less than the nearest lower range, switch to a lower scale in order to get a more accurate result. If necessary, switch to the next (even more sensitive) measuring range.
4. Using luxmeter, measure illuminance of different desk-top surfaces in the classroom (for example, at the window, on a desk near a window, on a desk in the middle of the room and on a desk at the door).
5. If possible, measure the distance from the nearest source of light (natural and/or artificial light source).
6. Write the measured values into the table 1. If appropriate, use scientific notation. Describe each measuring site, including the orientation of the probe relative to the light source.
7. Compare the obtained results with recommended values of illuminance for different types of premises.
8. Explain and discuss obtained results.

Note
Orange painted cells have to be filled in BEFORE your arrival on practical training.
Green painted cells have to be filled during the measurement, or later - during protocol processing.
Parts of the procedure denoted in italics designate your homework - processing measurement results at home.

Fig.1: Luxmeter MS-1300 VOLTCRAFT (left) and PU 150 (right).
Measurement of illuminance

Date of the measurement: [ ] Time of the measurement: [ ]

I have studied the theory for practical training from:

(specify a complete bibliographical reference including appropriate chapter and page designation)

Used devices and tools (orange color = assumed, green color = really used):

Microclimatic conditions of measurement:
- atmospheric pressure \( p = \) mmHg = kPa
- air temperature \( t = \) °C
- relative air humidity \( \varphi_{\text{rel}} = \) %

External conditions of measurement (e.g. weather, if relevant):

Measurement results:
Tab. 1. Illuminance at selected locations

<table>
<thead>
<tr>
<th>Measurement No.</th>
<th>Measurement location, light source distance, probe orientation.</th>
<th>Illuminance [lx]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
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<tr>
<td>2.</td>
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<td>3.</td>
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<td>4.</td>
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<td>5.</td>
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</tbody>
</table>

Date and teacher’s signature: __________________________
Measurement of illuminance

Date of the measurement: __________  Time of the measurement: __________ 1

Used devices and tools: 

Microclimatic conditions of measurement (enter correct units where missing):

atmospheric pressure  \( p = \) __________ kPa

air temperature  \( t = \) __________

relative air humidity  \( \varphi_{\text{rel}} = \) __________

External conditions of measurement (e.g. weather, if relevant):

Measurement results:

Tab. 1. Illuminance at selected locations. Enter each value with correct units.

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Discussion:

Physical principle of measurement of illuminance.

Evaluation of measurement conditions, effect of microclimatic factors and possible sources of measurement errors.

Comparison of measured data with tabular (reference), possibly critical values.

Where did you get the reference or critical values of illuminance for various types of premises (rooms) and various activities? Cite references in the correct form.

20.9.2017
Conclusion:
Summary of main results and their biophysical interpretation.

Significance of illuminance in medicine and medical research.

References:
(For example, from where you studied the theoretical background for illuminance measurement, photometry ... Cite references in correct form.)

Overall max. 25
Bonus max. 2

Score: __________
Date and teacher’s signature: __________________________