



Course Memo

CH2004 - Evaluation and Measures of the Physical Work Environment, 7.5 credits

Autumn 2022
2022-10-28





Welcome to the course on Evaluation and Measures of the Physical Work Environment!

The course deals with the topics *Thermal climate and ventilation, Lighting and visual ergonomics, and Electromagnetic radiation* at the workplace. Preventive work aims to design work, workplaces, work tasks and the work environment to promote safety and health, as well as individual and organisational performance.

The course is multidisciplinary. The course design and mix of student backgrounds support mutual learning and understanding of different perspectives. We encourage new ways of approaching problems and opportunities, and reflections on how to make use of theories and methods from the course in practical applications.

The overall aim of the course is to provide knowledge about climate and ventilation, lighting and visual ergonomics, and electromagnetic radiation at the workplace, their impact on safety, health, well-being, and performance.

The objective is also to provide knowledge about how to manage these factors and reduce risks, through technical and organisational design of work, workplaces, and the work environment.

Intended Learning Outcomes (ILO)

By the end of the course, the students should be able to:

ILO 1. Describe, exemplify, and explain how all the above-mentioned factors affect safety, health, well-being, and performance.

ILO 2. Perform measurements and risk assessments relating to all the above-mentioned factors. Describe and motivate the choice of different measurement strategies; be able to interpret and draw conclusions from measurement results, be able to understand and evaluate the causes of exposure and, when required, propose countermeasures to eliminate or reduce exposure. In order to conduct measurements knowledge about measuring methods and strategies is required.

ILO 3. Propose work environment improvements according to the hierarchy of control concerning the above-mentioned factors and by reflections regarding the interactions among sociotechnical (human, technology, and organisation) perspectives.

ILO 4. Describe the EU regulations and Swedish legislation and provisions for all the above-mentioned factors and critically discuss risk assessments and work environment improvements in relation to relevant work environment regulations.



COURSE DESIGN

The course consists of online learning activities through Zoom and three mandatory laborations at campus in Flemingsberg. There is a mixture between lectures, laboratory exercises, seminars, group work, and assignments.

Examinations

Examination	Credits	Grading	ILO
OVN1 - Exercises	1.0	Pass/ Fail	2
RED1 - Project Work	2.5	Pass/ Fail	1-3
TENB – Practical Exam	1.0	Pass/ Fail	2
TENA - Written Exam	3.0	A, B, C, D, E, FX, F	1-4

The examinations are further described on pages 4-5. For more information see the [Course syllabus](#).

COURSE LITERATURE

See the literature list in Canvas.

TEACHERS & GUEST LECTURERS

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COURSE COORDINATOR AND EXAMINER

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Project Work

The purpose of the project work (RED1, 2.5 credits) is to practice planning, performing, and analyzing measurements of *Thermal climate and ventilation*, *Lighting and visual ergonomics*, and *Electromagnetic radiation*. Based on your results, you will assess whether the work or work task constitute a work environment problem and, in such cases, suggest measures to correct the conditions. The project is carried out in groups. There are four opportunities for supervision, including one mandatory supervision where you present your measurement strategies. Peer-review of one other report draft is part of the project work.

The examination consists of a written report and an oral presentation (January 12th). The project is individually examined on the grading scale Pass/Fail. See overall time plan in the detailed course schedule in Canvas.

Laborations & Exercises

The exercises in the course (OVN1, 1 credit) consists of three mandatory on-campus laborations, one assignment related to thermal climate called “Aiming” as well as a lab report for *Lighting and Visual Ergonomics*. The grading scale is Pass/Fail.

Overview of Labs

- 1) *Climate and Ventilation*: Measurements of Temperature, Air Velocity and Air Volume Flow.

- 2) *Lighting and Visual Ergonomics*: Measurements of *illuminance*, *luminance*, *flicker* and quantification of the *Daylight factor*.

- 3) *Electromagnetic Radiation*. Demonstration of equipment and case discussions.

The Assignment Thermal Climate – Aiming

The assignment related to thermal climate, called “Aiming”, will be introduced on *November 9th*. The instructions will also be provided in Canvas and the answers need to be submitted by *November 21st*. Feedback on solutions for the assignment will be discussed *November 25th*.



Examinations

Practical exam (TENB, 1.0 credit)

On the practical exam on campus Flemingsberg (December 13th) you will get to show that you can use the equipment demonstrated in the labs for *Lighting* and *Climate & ventilation* as well as that you can identify and recognize sources of radiation. Grading scale: Pass/Fail. The measuring activities included are exemplified below. More details about the practical exam are provided in Canvas.

Lighting

Measure illuminance and luminance with a standard photometer and use the data to quantify glare and daylight in different ways.

Climate & Ventilation

Use some computer programs regarding climate calculations.
Use instruments to quantify the ventilation rate and volume flow.

Radiation

Identify and assess sources of radiation.

Written exam (TENA, 3.0 credits)

The written examination on campus consists of three themes related to the different intended learning outcomes. The grading scale is A-F. To get a grade of least E, all parts must have a score of $\geq 50\%$. Remember to register for the exam by December 13th.

Course Literature

To prepare for the lectures and labs we recommend that you read the connected literature for each topic in the course, see the literature list in Canvas.

We hope you will enjoy the course and learn a lot!

Kind regards,

The teaching team from the division of ergonomics and guest lecturers