Faculty of Electrical Engineering; University of Ljubljana
Laboratory for Lighting and Photometry

Instructions for the exam

in the subject Lighting Engineering

Exam in Lighting Engineering has two parts:

- Written exam.
- Oral exam.

As part of the written exam you will need to provide:

- Seminar paper on the given topic.
- Lighting project for the given interior.
- Presentation of your seminar paper and lighting project.

Written exam

Seminar Paper

In the Seminar paper you will present your knowledge about a proper lighting planning for a given interior. Your seminar paper needs to be in the prescribed form (see sample: Paper - sample.doc) and submitted electronically in a form that can be opened with MS Word (.doc or .docx) or Adobe Acrobat Reader (.pdf).

The mentioned sample word document can be used as a template for the program MS Word or you can also simply delete the contents in this file and add your own.

Seminar paper must be more than one page long, but not longer than two pages in the prescribed form (with the same page layout, font size, spacing ... as in the sample document). Shorter or longer papers will be evaluated negatively. The same applies for papers not written in accordance with the sample and the papers (files) which could not be opened in MS Word or Adobe Acrobat Reader.

In the paper, images and tables are desired, but should not take more than about half of the space.

Evaluation (grade) of the paper will depend on:

- Integrity of presentation of requests for given interior.
- Correctness of the statements in the paper.
- Appropriate use of figures and tables.
- Grammatical and typographical errors.
- Originality.
- Writing style, which should be technical but still readable.

Paper can be written in English or Slovenian.

Lighting design project of chosen interior

Within the project, you should design lighting for the given interior. First you need to make a list of working areas where activities are being carried out. Then for each working area you should specify (with the help of literature) the appropriate parameters that lighting must met (according to EN 12464-1 or SIST 12464-2: illuminance, unified glare ratio - UGR, color rendering index - CRI or Ra, other special requests ...). Afterwards you need to select the appropriate light sources and luminaires and arrange them in space. With the calculations in DiaLux you should validate that requirements listed in standard SIST EN 12464 are fulfilled (especially illuminance and its uniformity). For that purpose, you should define proper calculation surfaces in DiaLux. After confirming the results, you should print them in a file that can be opened with Adobe Acrobat Reader.

Once you have created a lighting design in DiaLux, you have to write also a technical report. It should contain description of all considered working areas, requirements for these areas and other assumptions that have been used in the selection and configuration of lighting sources and luminaires. Brief description of the selected luminaires and their layout should be covered also. Technical report should be made based on a

sample (Technical Report - sample.doc). It must include all relevant information, but should not be too long. It should primarily specify the technical data. The technical report must be submitted in electronic form, which can be opened with MS Word (.doc, .docx) or Adobe Acrobat Reader (.pdf).

Evaluation (grade) of the project will depend on:

- Suitability and layout of selected lamps and luminaires.
- Achieving the requirements of the standard for individual working places.
- Completeness of the technical report.
- Originality of solutions (both in terms of selected luminaires and their layout as well as the technical report).
- Grammatical and typographical errors.
- Writing style in the technical report.

Technical report can be written in Slovenian and English language.

How the written exam is carried out

Seven (7) days before the exam date no later than at 17:00 following will be published on the laboratory (subject) website (http://lrf.fe.uni-lj.si/ct-menu-item-2/svetlobna-tehnika) and/or on the subject page in scope of e-cho internet classroom (https://e.fe.uni-lj.si/login/):

- Given interior with short project task for each of the registered students.
- Instructions for carrying out the exam.
- Samples of seminar paper, project and technical report.

Two (2) days before the exam date no later than at 17:00, registered students have to send to the e-mail address: grega.bizjak@fe.uni-lj.si (or personally delivered to the office of prof. Bizjak - on an appropriate electronic medium) following:

- Seminar paper in electronic format with the file name: Seminar - First Name Last Name – StudentNumber.doc (or .docx or .pdf)
- Report printed from the DIALux project file with the file name: Project - First Name Last Name - StudentNumber. pdf
- Technical report in electronic format with the file name: Technical Report - First Name Last Name - StudentNumber.doc (or .docx or .pdf).
- Presentation (in MS Power Point or Adobe Acrobat form) of the seminar paper and lighting project with the file name: Presentation – First name Last name – StudentNumber.ppt (or .pptx or .pdf).

Students can arrange with teaching assistant to do a written exam at the faculty but they can also make it elsewhere. If they don't intend to do a written exam at the faculty they must provide their own computer with installed appropriate software:

- Text editor that can produce a file in MS Word for Windows format (.doc or .docx) or Adobe Acrobat Reader format (.pdf).
- Program that can create (print) desired output in a format that is readable with Adobe Acrobat Reader (.pdf).
- Latest version of DIALux (available at www.dial.de).
- Program for presentation.

Computer also needs to have access to the Internet.

Registered student who will not succeeded to send or deliver Seminar paper, Project, Technical report and Presentation in electronic form by a certain date until 17:00 will be evaluated negatively.

To be able to take a written part of the exam students need to have positively evaluated exercises. Without the positive grade for exercises entered into the Study information system Studis it is not possible to register for the exam.

If you have any questions, please ask prior to the start of the exam. You can submit questions or comments also during the exam via e-mail: grega.bizjak@fe.uni-lj.si or by calling 01 4768446. However, it is not necessary that you will receive a response in a due time.

Oral exam

Oral exam will be held on a day of exam published in Studis with the beginning anticipated at 10:00. Exact time and place will be published together with the documents for written exam.

In scope of oral exam, you need to present your seminar paper and lighting project with help of a computer presentation like Power Point or Adobe Acrobat slides. The duration of presentation is max. 15 minutes (max. 15 slides). When presenting lighting project, you should follow this order: observed working places in interior, recommendation and requirements for lighting of these working places, choice of luminaires with justification, choice of light sources with justification, placement of luminaires with justification, results… After the presentation you will also need to answer questions from professor and/or colleagues.

Presentation file need to be sent together with other files at the end of written exam.

Registration

Registration for written exam by the information system Studis is required at least 8 days prior to exam date. Students who have registered for the exam, but do not plan to attend, must sign out. Otherwise they will be evaluated negatively.

All grades (also negative ones) will be entered into information system Studis.

Final grade

Final grade consists of:

- Grade for seminar paper.
- Grade for project.
- Grade for oral exam.
- Grade for exercises.

The final grade is positive only if all four grades are positive (6 or more). It is calculated as the average of all four partial grades. In the case that any of these four grades is negative the student need to repeat the whole exam.

Tips and tricks

You will have 120 hours to finish your written exam and prepare presentation. But this is in relation to the work that must be carried out, not very much. To avoid problems, I propose to consider some of the following tips.

If you plan to do the exam on your own computer, you should check if everything is working at least in the week before the exam starts. Download the sample files from subject webpage. Check to see if your computer can display the files in .pdf form. Open the sample Seminar paper in your text editor and check if the design is appropriate, and you can edit the text. Also check if the text editor can save the file in the correct format or if you can print it in .pdf format. Then check if you have the latest version of DIALux. Open the example of project file which is published on the website in DIALux and check if the premises are displayed correctly. Then check if you can make your own project and you have access to adequate databases of luminaires and if you can import them into a project and perform calculations. Try also to create relevant extracts (reports) from the DIALux in .pdf format and check how they look. Before printing it, check also what all can be printed from DIALux, and select only pages that contain data which confirm the correctness of your project. Make note about this pages in the notebook so that you can quickly ticked them when you will be printing report during the exam.

Selected interiors for seminar papers and projects are always posted at least one week prior to the exam start (without student names). Browse through posted topics and for each of them look at the literature, where you can find relevant information. For each topic you can also write out some basics considerations for lighting as well as requirements from standard SIST EN 12464 (table published on the subject webpage) for possible workplaces. You can already search for some relevant pictures for each of the topics. So prepared data will be of great help during the exam and will save you some valuable time. Further you can also prepare a draft of the Seminar paper where you enter your data, delete what you know that you not need and check out what you need to change (titles, captions under pictures and tables ...).

Check in DIALux if databases of luminaires are working. Think about what luminaires are appropriate for different working places and rooms. You can also make a table in which you enter the names of luminaires and their main properties: light source, if light distribution is wide or narrow, are they good for small spaces,

high places, industrial premises, offices ... In this way you will find a proper luminaire much faster when you will be working on the project.

Do as many cases in DIALux as possible. Thus, you will be able to work faster and in decisive moments you will not need to review the instructions.

Once you start to work on exam, first focus on Seminar paper. Find relevant literature from your notes and read it. Select the parts that you will use in your seminar. Select the images and tables that could be used. Find out the requirements of the standard and enter them in the appropriate table. Then write a paper and insert images, tables ... and print it.

After your Seminar paper is finished start with the project. First make a model of given interior in DiaLux and equip it with needed furniture…. Furniture can be modeled in abstract form (e.g. with cubes) but you should take care on dimensions, colour, surface properties … which influences the distribution of light in a room. Distribute the workplaces, mentioned in a project task into the room. Write workplaces on a piece of paper and equip them with the requirements from the standard. Based on the written requirements choose the lighting concept (general, localized, local lighting) in each of the rooms. Select the appropriate light sources and find the appropriate luminaires in your summary luminaire database. Insert calculation planes in DiaLux model at all workplaces you have marked before. Insert selected luminaires in place and properly arrange them (or leave DIALux to arrange them). Perform calculations and check the results. If results are in line with requirements from standard and you are satisfied with them, make a printout of the project.

Last step is preparation of the presentation for the oral exam. Think over what are the most important things in your seminar paper and project and divide them into 15 slides. You only have 15 minutes for presentation of the seminar paper and the project. Prepare slides which will show your "way" toward best lighting solution. Especially show why you have selected used light sources, luminaires and their placement… Your presentation must prove that your project is “the best” in any sense: ergonomically, technically and economically.

Check all documents (files) and their names at the end and send them by e-mail.