

Catalogue Code: ARCH 447

Course Title: Electrical Services - Lighting

Department: Architecture

Term: Fall 2007

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Location: Room 212, Thursday 10:30-12:30
Credits: 2
Prerequisites: none

Office hours: By appointment

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**Term Project:
Option 3: Macro**

Where Mini and Micro dealt with industrial design and architectural spaces respectively, Macro attempts to come to terms with the larger scope of urban lighting. Perhaps the most challenging of the three, this project requires the team to integrate all levels of lighting design, from detailed fixture design, to specific building treatments, to creating a lighting masterplan. This masterplan will give life to a coherent and contextual aesthetic identity, and provide a framework for future interventions. You will be working in groups of five students.

We are fortunate, or perhaps not, to have on our doorstep a poor example of urban lighting. The lower McGill campus appears to have been lit without a thought to aesthetics, safety, or even maintenance. Building have been floodlit in a haphazard manner, with no coordination between architects or the university as to source choice, shielding, volumetrics, or any other design factors which could have given the campus a unified nighttime image. This project will be tackled by groups of five students and will have three specific themes to be developed. They are:

- Urban analysis
- Individual building lighting
- Fixture language and source choice

In Urban Analysis, the team will survey the campus, taking note and documenting with photographs, existing installations which they find offensive, poorly executed, or not in keeping with their plan for the campus. Light levels should be metered and compared with IESNA norms to generate benchmarks for safety and context. An existing map of the campus should be annotated with fixture types, sources and mounting. Keynotes can complete the survey.

NOTE: STUDENTS SURVEYING THE CAMPUS AFTER DARK ARE ADVISED TO WORK IN GROUPS AND TAKE SENSIBLE SECURITY PRECAUTIONS. Following this initial analysis, the team should proceed to isolate a hierarchy of lighting levels, based on points of note, axis, observed traffic patterns, and areas deemed unsafe.

Once a clear sense of the strengths and shortcomings of the McGill Campus lighting has been established, the team should select three buildings that require either remediation or new attention. The existing conditions should be documented, preparatory sketches or photo renderings should be generated showing intended results, and fixture/source choices should be made. A simulation should be generated using "real" IES parametrics and a vector based rendering engine. Ideally, one building should be mocked up. This entails ordering sample fixtures and coordinating with the chosen building to gain access to power for the duration of the mockup.

Ideally, the third aspect of the project should dovetail nicely with the research the team will already have completed. Much of the problematic lighting on campus finds its origin in poor fixture and source choice. In many instances, unshielded sources create glare and do not direct the light where it is needed. Often source colors and intensities are at odds with the materials and volumetrics they are illuminating. In this stage of the project, the team will select appropriate fixtures to complete their building illumination, make general recommendations regarding source choice across the campus, and present a family of fixtures that will form the basis of selection for all urban "street" lighting.

The team will give an initial presentation of the project in class on November 1st. Based on your feedback from this initial presentation, you will carry out a more detailed design analysis and present your results in a report and a second presentation during the end of term exam period (date to be determined). Please provide the following four deliverables:

- (1) Oct 18: a short proposal for your clients (a.k.a. McGill University) to sign off (PDF one pager)
- (2) Nov 1: initial oral presentation (30% of final mark, PDF)
- (3) Exam period: final presentation and simulation report (50% of final mark, 2 PDFs)

(4) One week following crit: post mortem analysis (10% of final mark, email)

* The remaining 10% of your final mark for this course are reserved for your participation in in-class exercises.

Please note: The last three documents (the proposal, client report and presentation) should visually “go together” and form a complete package. Consider your graphic and organizational approach with this in mind.

Guideline for Proposal (one pager)

Describe your objectives and the driving context for the redesign of the campus lighting. Your “client” could be a building owner, another designer, etc.. Remember to provide a project name and the names of all involved students, in addition to your team number. The team number will be assigned once you have submitted the names all students on the team.

Scenario: describe the project, and the relationship between you and your client

Objective(s): what do you want to do?

Methodology: how do you intend to do it?

Guideline for Client Report

This is a key deliverable for your client. Make sure information such as your names, contact information and project results are easy to find.

Layout: consider aspects such as: readability, ability of the reader to write comments in the report, how well does the report copy in black and white? How well is it organized?

Executive Summary: Everybody is busy, especially decision makers. To be able to influence design decisions, your report should include an “executive summary”, i.e. a one to two page summary that briefly reviews project objectives, what design aspects have been investigated, and what are the results.

Introduction: Review the project objectives (restate your proposal), detailing what aesthetic technical and/or environmental issues you are attempting to address.

Methodology: Briefly state the programs and models you have used, the types of fixtures involved and the choice of light sources (ie incandescent, fluorescent, etc...)

Keyed “before and after” campus maps: Provide a large scale Arch E (30x42) “before” map illustrating your survey findings. This map should have a legend indicating existing fixtures and types, highlighted problem areas, and be legible enough to discern groupings or patterns of fixtures. The “after” map (also Arch E) should isolate areas of intervention, provide typed fixture choices which refer to your assembled fixture choice cutsheets (see next item). Both maps should also be reproduced in 11x17 fold out format within the bound report document.

Cutsheets: As shown in class, each fixture has a “cutsheet”, or information sheet, which describes the physical attributes (size, distribution, light output, etc...). Provide a package of keyed cutsheets to describe the fixtures you will be using in you design.

Results and Analysis: Present your results and “explain them”. The existing conditions should be documented with annotated photographs. Point out how the initial design could have better addressed lighting concerns had lighting been a primary concern from the outset and were all parameters open to adjustment.

Design Advice: Summarize your design advice based on the results from the previous section. Be specific, use numbers if you can.

Appendix: In case your report becomes “longish”, consider moving details such as simulation parameters, extra figures, etc. into an Appendix to enhance readability. If you choose to do so, indicate this in the main text.

Guideline for Presentations

- Initial Presentation: present your design proposal; be prepared for questions
- Final Presentation: same message and content as client report; present your prototype (make sure it lights up!); be prepared for questions based on the effectiveness of your chosen strategies.

Guideline for Post Mortem Analysis

Wherever you are going to work, the ability to manage your time will be an asset. You should therefore develop the habit of tracking the time you spend on any given project using a log book. Do not overdo it. This is supposed to be a helpful tool. Estimate in hour units how much time you have spent and what you have accomplished using the form below. After you have delivered your presentation, use the log book to write a brief analysis of how much time you have spent on the project, where (in retrospect) you could have saved time, and which parts of your report you might reuse in other projects in the future. All in all, this should take no more than 30 minutes and might be a useful exercise for the future.

Post Mortem Form

1st Phase: Project scoping	comments	hours
- refine project constraints		
- learn software		
2nd Phase: Initial design		
- prepare computer model		
- assemble the data		
- formulate design recommendations based on simulation results		
- prepare and deliver first presentation		
3rd Phase: Design development		
- redefine project scope (based on initial feedback)		
- refine computer model(s)		
- carry out daylighting analyses and determine success of each variant		
- assemble the data and formulate design advice		
4th Phase: Prepare final deliverables		
- write report		
- prepare final daylighting analyses at high resolutions		
- prepare and deliver second presentation		