Architectural Lighting Design **EVDA 617 Q(1.5-0)**

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Introduction

Lighting design can significantly affect the architectural perception of a space. Understanding the principles of architectural lighting is a basic step towards achieving comfortable, healthy, and environmentally responsible designs. In this course, lighting design will be addressed as part of the broader process of designing the visual experience in architecture. Both daylighting and electric lighting will be covered.

Course outcomes

By the end of this course, students will be able to:

1. To apply simple principles of lighting design process including the use of the 5 layers approach.
2. To develop illumination schemes that enhance an architectural design.
3. To demonstrate knowledge of electric illumination systems and design techniques.
4. To demonstrate knowledge of daylighting and its design principles.
5. To analyze designs quantitatively.
6. To demonstrate awareness of sustainable lighting design.

Teaching Approach

The course will be presented in lecture and workshop mode. The workshops will include lighting exercises, and will cover development of lighting designs using lighting maps and redline layouts. The project is a lighting design exercise.

Content: Topic Areas & Detailed Class Schedule

The functions and characteristics of lighting systems will be reviewed, together with their place in the development of design concepts. Components and terminology will be discussed, as well as quantitative design methods. Factors in systems selection will be examined, including:

1. Visual perceptions and the illumination of interiors,
2. Terminology and measurement units in illumination,
3. Electric light sources,
4. Daylighting,
5. Basic calculations for lighting
6. Basic modeling of lighting system (Using DIAlux)

Week 1	Sept 15h	Introduction to Lighting Design; Eye and vision; Lighting perception.
Week 2	Sept 20th	**Introducing Project**; Physical characteristics of light; Lighting metrics.
	Sept22 th	Design process: 5 layers approach; Task illumination
Week 3	Sept 27th	Task Illuminance (ctd); lighting calculations; Lamps and lighting Equipment (1)
	Sept 29th	Lighting equipment (2) Lamps and Luminaires; Exercise of lighting calculations (cavity method, point by point method)
Week 4	Oct 4th	Light map process, lighting graphics, *Lighting* map practice (**using term project)**
	Oct 6th	Guest lecture (Lighting practice. tentative).
Week 5	Oct 11h	Block week
	Oct 15th	
Week 6	Oct 18th	Submission of Project part I (**Oct 17th)**
	Oct 20th	Daylighting (Definition and benefits, Daylighting surfaces, Daylighting design); Shading devices Tutorial (in class) using of DiaLux
Week 7	Oct 25th	Lighting specs and cutsheets, Lighting control and sustainability Project tutorial
	Oct 27th	**DIAlux / project tutorial**
Week 8	**Nov 1st**	**Final Exam**
	Nov 10th	**Project Due date**

Means of Evaluation

Evaluation will be based on:

Lighting Design Project (part A+B) 70%

Project part A (due Oct. 17th)- 25%: This part of the project deals with the conceptual design of architectural lighting, and will rely on knowledge gained in weeks 1-4 (outcomes 1-3)

Project part B (due Nov 10th)- 45%: This part deals with the analytical aspect of a lighting project, including calculation, developing of final lighting maps, selecting lighting equipment, etc. It covers all material learned in the course (Outcomes 1-6).

Final exam 30%

Total 100%

The final exam will be closed book, and will cover all term material.

Grading

Final grades will be reported as letter grades, with the final grade calculated according to the 4-point range. Grading will be based on the following scale:

Grade	Grade Point Value	4-Point Range	Percent	Description
A+	4.00	4.00	95-100	Outstanding - evaluated by instructor
A	4.00	3.85-4.00	90-94.99	Excellent - superior performance showing comprehensive understanding of the subject matter
A-	3.70	3.50-3.84	85-89.99	Very good performance
B+	3.30	3.15-3.49	80-84.99	Good performance
B	3.00	2.85-3.14	75-79.99	Satisfactory performance
B-	2.70	2.50-2.84	70-74.99	Minimum pass for students in the Faculty of Graduate Studies
C+	2.30	2.15-2.49	65-69.99	All final grades below B- are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements.
C	2.00	1.85-2.14	60-64.99	
C-	1.70	1.50-1.84	55-59.99	
D+	1.30	1.15-1.49	50-54.99	
D	1.00	0.50-1.14	45-49.99	
F	0.00	0-0.49	0-44.99	

Notes:
A student who receives a "C+" or lower in any one course will be required to withdraw regardless of their grade point average (GPA) unless the program recommends otherwise. If the program permits the student to retake a failed course, the second grade will replace the initial grade in the calculation of the GPA, and both grades will appear on the transcript.

Readings

The course texts are

- Russell, S., The Architecture of Light, 2012, Conceptnine, ISBN 978-0-9800617-1-0
- Lawrence Berkeley Laboratory, Tips for Daylighitng with Windows windows.lbl.gov/daylighting/designguide/dlg.pdf (free download)
- Lechner, N., 2014. Heating, cooling, lighting: Sustainable design methods for architects. John wiley & sons.
- Additional material will be posted on the course website.

Canadian Architectural Certification Board - Performance Criteria Met by Course

The following CACB Student Performance Criteria will be covered in this course at a primary level: B8 Environmental Systems, C2 Building Systems Integration
The following CACB Student Performance Criteria will be covered in this course at a secondary level: B4 Sustainable Design, B10 Building Service Systems, A2: Design Skills, C1 Detailed Design Development, C3 Technical Documentation, C4 Comprehensive Design.

Notes:

1. Written work, term assignments and other course related work may only be submitted by e-mail if prior permission to do so has been obtained from the course instructor. Submissions must come from an official University of Calgary (ucalgary) email account.

2. Academic Accommodations. Students who require an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to their Instructor or the designated contact person in EVDS, Jennifer Taillefer (jtaillef@ucalgary.ca). Students who require an accommodation unrelated to their coursework or the requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Vice-Provost (Student Experience). For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/

3. Plagiarism - Plagiarism involves submitting or presenting work in a course as if it were the student's own work done expressly for that particular course when, in fact, it is not. Most commonly plagiarism exists when:(a) the work submitted or presented was done, in whole or in part, by an individual other than the one submitting or presenting the work (this includes having another impersonate the student or otherwise substituting the work of another for one's own in an examination or test),(b) parts of the work are taken from another source without reference to the original author,(c) the whole work (e.g., an essay) is copied from another source, and/or,(d) a student submits or presents work in one course which has also been submitted in another course(although it may be completely original with that student) without the knowledge of or prior agreement of the instructor involved. While it is recognized that scholarly work often involves reference to the ideas, data and conclusions of other scholars, intellectual honesty requires that such references be explicitly and clearly noted. Plagiarism is an extremely serious academic offence. It is recognized that clause (d) does not prevent a graduate student incorporating work previously done by him or her in a thesis. Any suspicion of plagiarism will be reported to the Dean, and dealt with as per the regulations in the University of Calgary Graduate Calendar.

4. Information regarding the Freedom of Information and Protection of Privacy Act (http://www.ucalgary.ca/secretariat/privacy) and how this impacts the receipt and delivery of course material

5. Emergency Evacuation/Assembly Points (http://www.ucalgary.ca/emergencyplan/assemblypoints)

6. Safewalk information (http://www.ucalgary.ca/security/safewalk)

7. Contact Info for: Student Union (https://www.su.ucalgary.ca/contact/); Graduate Student representative(http://www.ucalgary.ca/gsa/) and Student Ombudsman's Office (http://www.ucalgary.ca/ombuds/).