ARCE 651 − Illumination Engineering II
Fall Semester 2012
Course Syllabus

Instructor	Hongyi Cai, Ph.D., Assistant Professor Office: 2134-C Learned Hall E-mail: hycai@ku.edu; Office phone: (785) 864-2597; Fax: (785) 864-5631 Office hours: **stop by anytime or by appointment**
Course website	**http://people.ku.edu/~h717c996/teaching.html**
Meeting Time	MWF 9:00AM - 9:50AM, 8/20/2012 - 12/7/2012
Location	**232 Art & Design building** (Bob Foley Illumination Lab): lecture and lab sessions; **1137 Learned Hall** (ARCE Senior Design Lab): computer simulations
Course Description	Advanced analysis, design, and modeling of different luminous environments, such as office lighting, lighting for the elderly, industrial lighting, safety and security lighting. It covers human factors in lighting, camera-aided light measurement technologies, advanced computer-aided lighting simulations. Effective and efficient integration of natural and artificial lighting, and advanced lighting controls will also be involved.
Specific Outcomes of Instruction	Develop an advanced understanding of light and lighting in terms of human factors, measurements, calculations, computer-aided simulations, hands-on design skills and creative design methods.
Course Requirements	**Prerequisites**: ARCE 217 and ARCE 650 or consent of instructor Individual work, unless otherwise directed in class
Course Topics	**Part 1 – generalities** 1. Light and perception, the visual system (text chapters 1, 2, 6) 2. Light and health, the circadian system (text chapters 3, 13) 3. Lighting and work, visibility and legibility (text chapter 4) 4. Lighting and visual discomfort (text chapter 5) 5. Camera-aided light measurement technologies **Part 2 – specifics** 6. Lighting for offices (text chapter 7) – **Topic 1** 7. Lighting for the elderly (text chapter 12) – **Topic 2** 8. Lighting for industry (text chapter 8) – **Topic 3** 9. Safety and security lighting (chapters 9, 11) – **Topic 4** 10. Advanced computer-aided lighting design - **Final Project** (choose one topic)
Course Policies	**Classroom Etiquette** ↘ Respect and foster a positive classroom environment by refraining from any class disruption, such as eating and drinking, noise, arriving to class late, leaving class early, reading newspapers, using cell phones, falling asleep in class, etc. ↘ Cell phones shall be turned off during classes. ↘ Laptops are allowed in class for course activities (e.g., searching lamps and fixtures on manufacturers' website), but course irrelevant activities, such as emails, online chat, video, etc., are prohibited.

Class participation is important

- Class attendance is very important, so come to class on time. Students arriving to class late must do so quietly. Students expect to be late to or absent from a class should seek permission in advance.
- Absence from or lateness to a class is a behavior of unprofessionalism and will lead to deduction of credit for being professionalism (5%, see grading policy for more details). Exceptions to lateness or absence will be made for illness, emergencies, job interviews, other circumstances **proven** beyond a student's control.

Submissions on time

- A quiz given in each class will be due by the end of the class.
- All take-home assignments will be due at **9:00 a.m.,** before class on each due date, unless otherwise directed by the instructor.
- A detailed work plan for the final project will be due at **9:00 a.m.,** before class on 11/9, F.
- The final project will be due at **4:00 p.m.,** on 12/7, F
- Late penalties of **20%** per day, no acceptance after 5 days. Exceptions will be made for illness, emergencies, job interviews, other circumstances **proven** beyond a student's control.

Text book

Human Factors in Lighting, 2nd Edition, 2003
Peter Boyce, Lighting Research Center, Taylor & Francis
ISBN: 0-7484-0949-1 (hbk), 0-7484-0950-5 (pbk)

Reserved in the front desk of the Spahr Engineering library, also available in the Bob Foley Illumination Lab where the class meets.

Reference books

More required readings other than the text include instructor's notes, which will typically be handed out in class, and excerpts from following books, guidelines, recommended practices and standards.

- *The IESNA Lighting Handbook: **10th** Ed*. New York, NY: Illuminating Engineering Society of North America.
- IES. (2003). G-1-03. Guideline for security lighting for people, property, and public spaces.
- IES. (2007). RP-28-07. Lighting and the visual environment for senior living.
- IES. (2004). RP-1-04. American national standard practice for office lighting.
- IES. (2007). RP-27.1-05. Recommended practice for photobilogical safety for lamps and lam systems – general requirements.
- IES. (2007). RP-27.3-07. Recommended practice for photobilogical safety for lamps – risk group classification and labeling.
- IES. (2001). RP-7-01. Recommended practice for lighting industrial facilities.
- NFPA. (1997). NFPA 101 life safety code.

Assignments

- There will be a quiz given in every class in a period of 8/22 – 11/5, or directed by the instructor.
- There will be **five** take-home assignments (A1-A5, as listed in the Course Outline later) for topics covered in Part 1 —lighting generalities, including after-class readings, problem sets, case studies, field measurements, and others.
- There will be **one** final project for each group of **2-3** students who choose to work on the same lighting topic covered in Part 2 —lighting specifics. A detailed work

plan of the final project is needed as soon as the students have chosen the topic for the final project, and shall be approved by the instructor. A student may also work on the final project alone with **approved** reduced workload if he/she prefers. A class presentation of a preliminary design of the final project is also required and will be due on 11/19, M, unless otherwise directed in class.

Your assignments will be graded based on completeness, accuracy, neatness, documentation (logically organized), legibility (handwriting is clear enough, large enough, and dark enough to be easily read by the instructor), and other criteria shown on each assignment sheet. All instructions for the formatting and submitting of written work must be followed. Written work that does not comply with these requirements will be assigned a grade of zero. Staple all pages together in the upper left hand corner and put your name and assignment number in the upper right hand corner of the cover page. Do not fold your assignment. Engineering paper is not required.

Examinations

One mid-term exam is scheduled. No make-up exams will be given without prior consent of the instructor. Any student missing the exam without permission will be assigned a grade of zero for that exam. **NO final exam.**

Mid-term exam schedule: 9:00-9:50 a.m., 11/12, Monday

Mid-term exam will cover lectures, homework, and reading assignments for the indicated class periods shown in syllabus or directed in class.

Course Grading Scale

Course grades will be assigned according to the following scale:

Letter Grade Point Range	Grade	Grade Description
90 - 100	A	For work of marked excellence, indicating high honor
80 - 89	B	For work much more than average quality.
70 - 79	C	For work of average quality.
60 - 69	D	For work of the lowest quality, minimally passing
0 - 59	F	For work not of sufficiently high quality to merit credit for the course.

Course Grading Components & Percentages

Grade of ARCE651 will be calculated based on the following grading components and percentage distribution:

Grading Component	Percent Grade (%)
Professionalism* Grade scale: 0-5 (none = 0, poor = 1, average = 2, above average = 3, very good = 4, excellent = 5)	5
Quizzes in class	15
Course assignments: **A1-A5** ↘ A total of 5 assignments ↘ Each assignment has 6% of the grade	30
Mid-term examination: **T**	20
Plan and pre-design of the final project: **P1**	10
Final project: **P2**	20
Total Grade Percent	**100**

* Professionalism includes class attendance, submission on time, being active in class discussions, participation in field trips, being neat, legible, logical, and concise in your homework, exams, and final project.

Academic Integrity Policy

Students are expected to have academic integrity and abide by the Academic Misconduct Policy defined and dealt with in accordance with Article II/Section 6 of the University Senate Rules and Regulations (*https://documents.ku.edu/policies/governance/USRR.htm#art2sect6*)
Failure to comply may result in a grade of zero in course assignments, exams, or the entire course, and/or up to expulsion from the School or University. All academic misconduct will be reported to the department and/or dean's office for further actions.

Compliance with the Americans with Disabilities Act

The Academic Achievement & Access Center (AAAC) coordinates accommodations and services for all KU students who are eligible. If you have a disability for which you wish to request accommodations and have not contacted the AAAC, please do so as soon as possible. Their office is located in 22 Strong Hall; their phone number is 785-864-4064 (V/TTY).
Information about their services can be found at http://disability.ku.edu. Please contact me privately in regard to your needs in this course.

Course Schedule

(Subject to adjustment as the course progresses without further notice)

Classes	Date	Topics	Text chapters	Course Assignments	Due date
1	8/20	Course introduction			
2-4	8/22 – 8/27	Light and perception, the visual system	1, 2, 6	**A1**	9/5, W
5-6	8/29 - 8/31	Light and health, the circadian system	3, 13	**A2**	9/10, M
No class	9/3, M	Labor day			
7-9	9/5 - 9/10	Lighting and work, visibility and legibility	4	**A3**	9/14, F
10-12	9/12 - 9/17	Lighting and visual discomfort	5	**A4**	9/21, F
13-16	9/19 - 9/24	Camera-aided light measurement technologies		**A5**	10/5, F
	9/26	Camera-aided field measurement			
17-20	9/28 - 10/5	Lighting for offices	7		
No class	10/6 – 10/9	Fall break			
21-24	10/10 - 10/17	Lighting for the elderly	12		
25-28	10/19 - 10/26	Lighting for industry	8		
29-32	10/29 - 11/5	Safety and security lighting	9, 11		
		Assignment: a detailed work plan for the final project			11/9, F
33-34	11/7 - 11/9	Advanced computer-aided lighting design of the final project **			
35	11/12, M	Mid-term exam, 50 minutes		**T**	
36-37	11/14 - 11/16	Continue -- advanced computer-aided lighting design of the final project **			
38	11/19, M	Presentation of the pre-design of the final project: **P1**			
No class	11/21 – 11/25	Thanksgiving			
39-43	11/26 - 12/5	Final project		**P2**	12/7, F

** Lighting computer simulation will be taught in ARCE Senior Design Lab - 1137 Learned Hall