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**ÇANKAYA UNIVERSITY**

**FACULTY OF ARCHITECTURE / DEPARTMENT OF ARCHITECTURE**

**2014-2015 SPRING SEMESTER**

**ARCH 244: BUILDING SCIENCES II - ACOUSTICAL & VISUAL COMFORT**

**Instructors:**

**Assist. Prof. Dr. Papatya Nur Dökmeci Yörükoğlu: Office: 106/2, papatya@cankaya.edu.tr**

**Dr. Özge Süzer: Office: 104/3, ozgesuzer@cankaya.edu.tr**

**Course Day/Time/Location: Friday/10:00-13:00/B-211**

**Overview:**

This course concentrates on the basic concepts of acoustics and human hearing, behavior of sound in enclosed spaces, the theories on architectural acoustics, and the basic principles of noise control and acoustic comfort in buildings.

This course also addresses human needs and comfort in relation to the natural and artificial lighting as an art and science. Issues of vision, psychological, physiological and technical aspects of artificial and natural lighting, and their applications are analyzed.

**The objectives of this course are:**

* To introduce basic concepts and principles of acoustics
* To describe the physical, physiological, and psychological principles of auditory perception and the concept of acoustic comfort.
* To give an overview of architectural acoustics and environmental noise
* To explain the characteristics of spaces designed for effective listening, working, learning, and other functions.
* To provide an understanding of the theories used in building acoustics
* To present the concepts and application of architectural acoustics in terms of acoustic enhancement and noise control in enclosures.
* To acquaint each student with the basic concepts and principles of natural and artificial lighting.
* To explain the physical, physiological, and psychological principles of visual perception and the concept of visual comfort.
* To define the guidelines regarding effective natural and artificial lighting for the spaces or buildings to be designed.
* To present the application techniques of natural and artificial lighting in order to utilize, control, and modify them in architectural design.

**At the end of this course, students should:**

- Have gained an understanding of the basic concepts of acoustics, and auditory perception

- Have a comprehensive knowledge of theories used in architectural acoustics

- Be able to identify, discuss and resolve acoustical problems related to architectural acoustics, and acoustic comfort.

- Be aware of the analysis and improvement techniques, as well as material usage and applications relevant to architectural acoustics.

* Have knowledge of the basic concepts, principles and applications in architectural lighting.
* Embrace a responsibility for the welfare of humankind in a global scale, as to the social and environmental effects of architectural applications regarding artificial and natural lighting.
* Detect the design necessities of a structure considering the issues of artificial and natural lighting.
* Analyze the needs of occupants of a building, regarding artificial and natural lighting.
* Analyze and compare the technological solution alternatives in the market for artificial and natural lighting.
* Propose design solutions considering the issues of artificial and natural lighting.

**Reference Text Books:**

1. Architectural Acoustics, M. D. Egan, Mc Grawhill Inc., 1988.
2. Design for Good Acoustics and Noise Control, Macmillan Education, 1988.
3. Concepts in Architectural Acoustics, M. D. Egan, 1972.
4. Architectural Interior Systems, Lighting, Acoustics, Air Conditioning, J. Flynn, J. A. Kremers, A. W. Segil, G. Steffy, Van Nostrand Reinhold, 1992.
5. Concepts in Architectural Lighting, M. D. Egan, Mc Grawhill Book Co., 1983.
6. Interior Lighting for Designers, G. Gordon, John Wiley & Sons Inc., 2003.
7. Architectural Lighting Design, G. Steffy, John Wiley & Sons Inc., 2002.

**Grade Breakdown:**

Midterm I: %25, Midterm II: %25, Final Exam: %40, Interest and Participation: %10

**\*Attendance to at least %70 of the courses is mandatory by university policy!**

\* **27/03/2015** – Deadline to **withdraw** from the course!!!

**Weekly Program:**

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| **WEEK** |  | **DATE** | **SUBJECT** |
| **1** | **ACOUSTICS & NOISE CONTROL** | 13/02/2015 | Introduction to Acoustics: What is sound? Basic Principles |
| **2** | 20/02/2015 | 5 Important Sound Phenomenon |
| **3** | 27/02/2015 | How does sound travel? |
| **4** | 06/03/2015 | How can we hear? |
| **5** | 13/03/2015 | Analyzing architectural acoustics |
| **6** | 20/03/2015 | How to design better acoustic spaces? |
| **7** | **27/03/2015** | **MIDTERM I: ACOUSTICS** |
| **8** | **ARTIFICIAL & NATURAL LIGHTING** | 03/04/2015 | Physics of Light, Vision and Perception |
| **9** | 10/04/2015 | Color Spectrum and Color Perception |
| **10** | 17/04/2015 | Light and Form, Lighting Applications |
| **11** | 24/04/2015 | Artificial Light Sources |
| **12** | **01/05/2015** | **HOLIDAY** |
| **13** | 08/05/2015 | Natural Lighting: Factors Affecting Daylight, Orientation, Daylight Application Elements |
| **14** | **15/05/2015** | **MIDTERM II: LIGHTING** |