

Course Code	Course Name	Year/Semester	Theory	Practice	Credits	ECTS
ARC 3401	ENVIRONMENTAL CONTROL SYSTEMS IN BUILDINGS I	2019-2020/FALL	2	0	2	3

Level of Course: Undergraduate

Course Type: Core Course

Language of the Course: English

Course time: Tuesday- 10.00-12.00

Course

Classroom: ARC STD III

Office Hours: Monday 15.00-16.30

Mode of Delivery: Presentation, Assignments, Studio Works

Prerequisites and

Co-requisites:

Course Coordinator: Lecturer Oya KESKİN

Name of Lecturer(s): Lecturer Oya KESKİN

Course Teaching Assistant:

Course Objectives: The course will introduce the student to the physical environmental parameters and passive design criterias

Course Description: Passive climatization - Climate and climatic elements, climatic comfort, explaining of changing in climatic elements, design parameters related to built environment which are effective on climate and energy control (site, orientation, building envelope, building form, building distance, etc.), design of building envelope. Lighting- Definition of light, kinds of lighting; photometry, laws(regulations); visual comfort, design parameters related to built environment which are effective on light control (windows, room dimensions, reflectivities of internal surfaces, obstructions, artificial light sources, etc.), artificial lighting systems. Noise control - Definition of sound, human health and noise relation, design of built environment as a noise control system; noise and vibration control in buildings; sound insulation of building elements; acoustical design of halls.

Learning Outcomes:

- To gain knowledge about the basic principles of climatization and energy usage issues in environmental systems design.
- Protecting artificial resources and planning healthful building settlements.
- Ability to apply basic principles of building envelope materials and systems design correctly.
- Ability to use the basic principles of the illumination issues in environmental systems design.
- Ability to analyze design variables effective on light control of built environment.
- Ability to practice the basic principles of the artificial lighting system.
- Ability to use the basic principles of the acoustical issues in environmental systems design.

- Ability to design the built environment as a noise control system and ability to apply basic principles of noise control.
- Ability to apply the basic principles of sound insulation on building elements.
- To gain knowledge about the basic principles of room acoustics and ability to use this knowledge in practice.

Language: English

**Recommended
Text Books:**

- 1- Berköz, E., (1983), "Güneş Işınımı ve Yapı Dizaynı", Profesörlük Tezi, İstanbul, İTÜ Mimarlık Fakültesi Yayınları.
- 2- Berköz, E., Küçükdoğu, M. Ş., Yılmaz, Z., v.d., (1995), "Enerji Etkin Konut ve Yerleşme Tasarımı", İstanbul, TÜBİTAK INTAG 201 no'lu araştırma projesi.
- 3- Brookes, A. J., (1990), "The Building Envelope", Oxford, Butterwith Architecture.
- 4- Burberry, P., (1983), "Environment and Services", London, The Anchor Press Ltd.
- 5- Carter, C., de Villiers, J., (1987), "Passive Solar Building Design", Pergamon Press.
- 6- Cottom-Wirslow, M., (1990), "Environmental Design: The Best Architecture and Technology", PBC, Glenlove.
- 7- Duran, S. C., (2011), "Architecture & Energy Efficiency", Loft Publications, Spain.
- 8- Eriç, M., (1994), "Yapı Fiziği ve Malzemesi", İstanbul, Literatür Yayıncılık.
- 9- Gauzin-Müller, D., (2010), "Ecological Living: What Architecture for a More Sustainable City?", Actes Sud. - Gene, R., (1988), "Site Planning, Environment, Process and Development Brooks", New Jersey, Prentice Hall.
- 10- Goulding, J. R., Lewis, J. O., Steemers, T. C., (1992), "Energy Conscious Design", B T Batsford Ltd, Luxemburg.
- 11- Kreider, J. F., Kreith, F., (1977), "Solar Heating and Cooling", McGraw-Hill Book Company, USA. - Koenigsberger, O. H., Ingersoll, T. G., Mayhew, A., Szokolay, S. V., (1974), "Manuel of Tropical Housing and Building", Longman, New York.
- 12- Liacre, E., (1991), "Climate Data and Resources", London, Routledge. - Moore, F., (1993), "Environmental Control Systems", New York, Mc Graw-Hill, Inc. -
- 13- O'Callagan, P. W., (1978), "Building for Energy Conservation", Pergamon Pr, Bedford, England. - Ok, V., (1988), "Yerleşme Dokusu Dizayn Değişkenlerinin İklimsel Performans Açısından Optimizasyonu", İstanbul, TÜBİTAK.MAG 718.
- 14- Osbourn, D., (1985), "Introduction to Building", London, B T Batsford Ltd. - Özer, M., (1982), "Yapılarda Isı-Su Yalıtımları", İstanbul, Özer Yayınları:3.
- 15- Raiss, W., Çeviren: Köktürk, U., (1974), "Isıtma, Havalandırma ve İklimlendirme Tekniği", İstanbul, Arı Kitabevi.
- 16- Roaf, S., (2004), "Ecohouse 2: A Design Guide", Elseiver Architectural Press, Oxford.
- 17- Steele, S., (2005), "Ecological Architecture: A Critical History", Thames & Hudson.
- 18- Toydemir, N., Gürdal, E., Tanaçan, L., (2000), "Yapı Elemanı Tasarımında Malzeme", İstanbul, Literatür Yayıncılık.
- 19- Uffelen, C. V., (2009), "Ecological Architecture" Braun Publish. - Vidiella, A. S., (2010), "Atlas of Eco Architecture", Loft Publications, Spain.

**Planned Learning
Activities and
Teaching Method:**

Learning/Teaching Method: Studio-based lectures are given
Demonstrations are applied
Term project is given, discussion and presentation is done

Project Development: A series of assignments with emphasis on the main topic will be offered in this course.

Class Participation: Regular attendance of all enrolled classes is expected. Do not be late to the class. **Attendance will be taken through your signature within the first quarter of the class; if you come later you will be considered half-attended.** At the end of the Semester, your attendance will be reported on UBS system. Attendance is compulsory and in case of absenteeism of more than **20% for the practice and %30 for the theory, the system will automatically grade you "FF"**. If you miss a class, it is your responsibility to 'make up' all work, including items discussed in class.

Academic integrity & plagiarism: Academic integrity is the pursuit of scholarly activity based on the values of: honesty, trust, fairness, respect and responsibility. Practicing academic integrity means never plagiarizing or cheating, never misrepresenting yourself, never falsifying information, never deceiving or compromising the work of others. Basically this means, either intentionally or unintentionally, using the words or ideas of someone else without giving credit, it's strictly forbidden.

Course Text books: There is no specific textbook for this course. Students are required to study the recommended reading textbooks.

Key Works: In this studio course lectures and assignments mainly focuses on to learning passive design criterias.

Specific Rules:

1. Be punctual. Punctuality is a sign of respect toward yourself and the others.
2. Show respect for all the people and property around you.
3. Be responsible for your actions and meet all expectations.
4. Follow directions the first time they are given.
5. Students should use the Internet at school for academic purposes only.
6. It is forbidden to record classes with any type of device.

Communication: Students are encouraged to visit the professor during their Office Hours. If you cannot make it to announced office hours, please make individual arrangements via e-mail. However, do not expect the professor and the research assistant to respond at length via e-mail to questions of content, definition of terms, grading questions etc. If you have a question that requires a substantive response, please set up an appointment to speak with one of us.



**Course Contents*:
(Weekly Lecture
Plan)**

Date	Week	Chapter Topic	Take-home exercise
17.09.19	1	Introduction	
24.09.19	2	Passive climatization	
01.10.19	3	Passive climatization	
08.10.19	4	Lighting	
15.10.19	5	Lighting	
22.10.19	6	Noise control	
29.10.19	7	Noise control	
	8	MIDTERM EXAM	
12.11.19	9	Studio Work 1 - Site plan-distances between building	
19.11.19	10	Studio Work 2 - Design of building envelope related to thermal comfort	
26.11.19	11	Studio Work 3 - Determination of transparency ratios and window design, solar control	
03.12.19	12	Studio Work 4 - Evaluation of noise pollution at building site, calculation of sound transmission through building envelope.	
10.12.19	13	Studio Work 5 - Design of the artificial lighting system for a given space	
17.12.19	14	Studio Work 6 - Acoustical design of a given space	
2019 2020		FINAL EXAM	

* PLEASE NOTE: Details of the syllabus and course schedule are subject to minor changes that will be announced in class.

Assessment Methods and Criteria :	METHODS	EFFECTS ON GRADING
	Project Developments (Studio Work)	%60
	Midterm Exam	%20
	Final Exam	%20

ECTS Workload Table :	ACTIVITIES	NUMBER	HOUR	WORKLOAD
	Course Teaching Hours	7	2	14
	Project Development	6	4	24
	Midterm Exam Preparation	1	17	17
	Midterm Exam	1	1	1
	Final Exam Preparation	1	18	18
	Final Exam	1	1	1
	Total workload/25			75/25
	ECTS			3

GRADING AND EVALUATION

The students' progress will be evaluated throughout the semester. Students' grades lower than CC will be considered as failed.

Grade Scale:

90 - 100	AA	4,00
85 - 89	BA	3,50
80 - 84	BB	3,00
75 - 79	CB	2,50
65 - 74	CC	2,00
55 - 64	DC	1,50
50 - 54	DD	1,00
45 - 49	FD	0,50
0 - 44	FF	0,00

Course outline and evaluation criteria can be changed according to weekly progress by course instructor. If any change will occur, it will announce to students via e-mail.