

Fall 2018

INT 221-001: Building and Interior Systems I

Julio Figueroa

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BUILDING AND INTERIOR SYSTEMS I

INT 221

Fall 2018

Professor – [Julio Figueroa](#)
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 Office Location – 568 Weston
 Office Hours –by appointment

COURSE STRUCTURE

Lecture: Wednesday 10:00 – 11:20
 Friday 10:00 – 11:20
 Class Space: FMH Room 412
 Credits: 3

COURSE DESCRIPTION

An introduction to, and overview of, large-scale systems used in and affecting the design of building interiors. The operation and impacts of heating, ventilating, and air-conditioning equipment on building space and layout are emphasized. Additional topics include the design of plumbing and waste systems as they affect building planning and the design of related spaces, life safety issues including egress requirements and fire protection/suppression systems and the use and design requirements for vertical transportation in building interiors.

COURSE OBJECTIVES

- To introduce the concepts involved with the design of environmental control systems (ECS) for buildings. (CIDA Standard 12)
- Students should be able to apply the principles of ECS to real world applications (CIDA Standard 12)
- To develop an understanding of how the choice of building systems including HVAC and plumbing affect interior design solutions. (CIDA Standard 13)
- To present principles of vertical circulation systems in terms of their impact on design solutions (CIDA Standard 13)
- To establish an understanding of life safety and egress issues within buildings including fire protection/suppression systems. (CIDA Standard 14)
- To develop the ability for students to critically analyze environmental conditions within new and existing buildings (CIDA Standard 13)

TEXTS (Required)

- | | |
|-------------------------------------|--|
| Lechner, Norbert | <u>Heating, Cooling, Lighting: Sustainable Design Methods for Architects</u> , 3 rd Ed., James Wiley & Sons, 2009 |
| Lechner, Norbert | <u>Plumbing, Electricity, Acoustics: Sustainable Design Methods for Architects</u> , 1 st Ed., James Wiley & Sons, 2012 |
| Harmon, Sharon
Kennan, Katherine | <u>The Codes Guidebook for Interiors</u> , 4 th Ed., John Wiley & Sons, 2008 |
| *Allen, Edward | <u>How Buildings Work: The Natural Order of Architecture</u> , 3 rd Ed., Oxford University Press, 2005 |

* Optional but highly recommended

TEXTS (Reference)

Bingelli, Corky Stein, Benjamin Reynolds, John Grondzik, Walter Kwok, Alison	<u>Building Systems for Interior Designers</u> , 2 nd Ed., John Wiley & Sons, 2009
	<u>Mechanical & Electrical Equipment for Buildings</u> , 10 th Ed., John Wiley & Sons, 2006
Janis, Richard R. Tao, William K.Y.	<u>Mechanical & Electrical Systems in Buildings</u> , 10 th Ed., Pearson Prentice Hall, 2009
Kruse, Kelsey	<u>Interior Graphic Standards: Student Edition</u> , John Wiley & Sons, 2004
Reid, Esmond	<u>Understanding Buildings: A Multidisciplinary Approach</u> , 9 th Ed., The MIT Press, 1999
Woodson, Dodge	<u>National Plumbing Codes Handbook</u> , 2 nd Ed., Princeton Architectural Press, 2001

CLASS GUIDELINES

1 ATTENDANCE: You are expected to attend every class unless there is an acceptable excuse (see below). You are expected to be present in class for the entire duration of the class. If you arrive late or leave early without prior approval of your instructor you will be considered absent. An attendance sheet will be circulated at the beginning of each class. You are responsible for signing the sheet. If you miss a class, you are responsible for the material and directions covered. The NJIT attendance policy for Freshmen and Sophomores is as follows: **After three absences freshman and sophomores may be docked one-half grade for each subsequent unexcused absence.** (i.e., if the final grade would have been an 'A', it results in a 'B+'. A 'B+' becomes a 'B' and so on. There is a one-half grade penalty for EACH absence after the third)

Acceptable Absences:

Documented Illness

Documentation of an illness is accomplished in one of two ways; (1) personal observation by the instructor and (2) written note by a medical professional/practitioner who is *not* a family member of the student.

Religious Observation

Students must inform their instructor **prior** to class that they will miss a session (or more) due to religious observance. Students are permitted to observe religious holidays of one *and only one* religion per semester.

2 ASSIGNED WORK: Work is due as scheduled on the Syllabus or assigned by your instructor. Work will be accepted up to one week late but it will be dropped in grade.

All written work submitted for this course must meet the Standards for English I. Poorly written papers will be returned to you, without a grade, for revision. Students are encouraged to utilize the resources provided by NJIT for assistance with written papers.

3 EXAMS: Students must sit for all exams in order to receive credit for the class. Only excused absences **before** the exam is to take place will be considered for make-up at a later date.

4 DIGITAL TECHNOLOGY: *Cell phones and all PDA devices* are not permitted to be used in class to send or receive messages. If your phone disturbs the class you may be asked to leave and assigned an absence for that day.

Laptop computers are to be used exclusively for note taking and CAD. Under no circumstances are students permitted to use email, instant messaging, web surfing, or video/audio streaming during class unless expressly authorized by the instructor for the purpose of specific classroom instruction.

6 STUDENT ACCOMMODATIONS

All reasonable efforts will be made to accommodate a student with a temporary disability (e.g., broken arm, protracted illness, etc.) as long as the student is responsible for communicating with their instructor about the issue and for cooperating in its resolution. Students with more permanent physical or learning disabilities must provide documented requests for accommodation to their instructor *at the beginning of the semester* (or as soon as the disability is diagnosed and documented). Students should contact the Disability Office (<http://www.njit.edu/counseling/services/disabilities.php>) for further information and instruction for obtaining medical and/or psychological disability documentation.

ACADEMIC CONDUCT & HONESTY

Each student is responsible for reading and conducting themselves within the parameters of the *NJIT University Code on Academic Integrity*. Please refer to the NJIT website for the complete text of the policy. If you have questions of interpretation in this class please see your instructor for clarification. We welcome a discussion of our expectations.

“Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:

<http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.

GRADES

Your grade for the semester will be made up of the following assignments/performance. (See #1 - 4 above for elements that effect grading policy)

Homework & Quizzes	20%
Design/Analysis Project	20%
Exam #1	20%
Exam #2	20%
Exam #3	20%

GRADE CRITERIA

The Institute guidelines for grading are as follows. These guidelines will be used by your instructor to evaluate your work. Please familiarize yourself with these standards and discuss any questions with your instructor.

A Superior (4.0)

Student learning and accomplishment far exceeds published objectives for the course/test/assignment and student work is distinguished consistently by its high level of competency and/or innovation.

B+ Excellent (3.5)
B Very Good (3.0)

Student learning and accomplishment goes beyond what is expected in the published objectives for the course/test/assignment and student work is frequently characterized by its special depth of understanding, development and/or innovative experimentation.

C+ Good (2.5)
C Acceptable (2.0)

Student learning and accomplishment meets all published objectives for the course/test/assignment and student work demonstrates the expected level of understanding and application of concepts introduced.

D Minimum (1.0)

Student learning and accomplishment based on the published objectives for the course/project/test were met with minimum passing achievement.

F Inadequate (0.0)

Student learning and accomplishment based on the published objectives for the course/test/assignment were not sufficiently addressed nor met.

SCHEDULE

WK	DATE	TOPIC	READING
01 SEP	03 M	LABOR DAY HOLIDAY – No Classes	
		Introduction / Review of Syllabus and Guidelines	
	05 W	LEC 1 - ECS & Influence on Building Form and Sustainability Homework 1: Climactic Design	<i>Heating, Cooling, Lighting: Chap. 1</i>
	07 F	LEC 2 - Thermal Environment 1 - (Heat Transfer / Human Body) Homework 2: Passive Systems Search	<i>Heating, Cooling, Lighting: Chap. 3</i>
02	12 W	LEC 3 - Thermal Environment 2 - (Building Enclosure) DUE: Homework 1	<i>Heating, Cooling, Lighting: Chap. 15</i>
	14 F	LEC 3 - Thermal Environment 2 - (Building Enclosure), Cont'd DUE: Homework 2	<i>Heating, Cooling, Lighting: Chap 9.20-9.23 (pgs. 249-256)</i>
03	19 W	LEC 4 - Thermal Environment 3 – (Air Temperature & Humidity) Homework 3: Psychrometry Problems (in class)	<i>Heating, Cooling, Lighting: Chap. 2</i>
	21 F	LEC 5 - Air & Humidity – (Heating)	<i>Heating, Cooling, Lighting: Chap. 2</i>
04	26 W	LEC 6 – Air & Humidity – (Cooling) DUE: Homework 3 Homework 4: Roman Hypocaust Diagram VIDEO – Nova: Roman Baths	<i>Heating, Cooling, Lighting: Chap. 10</i>
	28 F	Exam #1 Review - 20 Questions DUE: Homework 4	
05 OCT	03 W	Exam #1	Recommended for Review: <i>How Buildings Work, Chap. 10, 11</i>
	05 F	LEC 7– Ventilation and Air Quality	<i>Heating, Cooling, Lighting: Chap. 15</i>
06	10 W	LEC 8– HVAC 1: Hydronic Systems Homework 5: Hydronic System Diagrams	<i>Heating, Cooling, Lighting: Chap. 16</i>
	12 F	LEC 9 – HVAC 2: Air Systems DUE: Homework 5	<i>Heating, Cooling, Lighting: Chap. 16, cont</i>
07	17 W	NJIT Campus Mechanical tour	<i>Heating, Cooling, Lighting: Chap. 16, cont.</i>
	19 F	LEC 10 – HVAC 3: Resource Management Exam #2 Review - 20 Questions ASSIGN: Design/Analysis Project	
08	24 W	Exam #2	
	26 F	LEC 11 – Plumbing: Water Supply	<i>Plumbing, Electricity, Acoustics: Chapt. 3</i> Pgs 62-103
09	31 W	LEC 12 – Plumbing: Waste Systems	<i>Plumbing, Electricity, Acoustics: Chapt. 4</i> Pgs 105-155
NOV	02 F	LEC 13 – Bathrooms Homework 6: Fixture Requirements.	<i>Building Systems for Interior Designers</i> Chaps. 8: Pgs. 117-136
	07 W	LEC 14 – Kitchens	
10	09 F	LEC 15 – Vertical Transportation Systems	

11	14	W	LEC 15 – Vertical Transportation Systems. Cont'd	<i>Plumbing, Electricity, Acoustics: Chapt. 7</i> Pgs 253-284
	16	F	Video: NOVA – Elevators; Trapped Man DUE: Homework 6	
12	21	W	LEC 16 – Life Safety 1: Emergency Egress Friday Classes Meet.	<i>Codes Guidebook, Chaps. 4-6</i> Pgs 213-251
	23	F	THANKSGIVING RECESS	
13	28	W	LEC 16 – Life Safety 2: Fire Protection, Firefighting, & Fire Suppression Systems	<i>Plumbing, Electricity, Acoustics: Chapt. 6</i> Pgs 213-251
	30	F	LEC 16 – Cont'd Exam #3 Review DUE: Design/Analysis Project	
14	DEC	05	W	Exam #3
		07	F	LAST CLASS Exiting Interviews
15			FINAL EXAM WEEK	

READINGS SUMMARY

Required

EXAM 1

Heating, Cooling, Lighting
Chapters: 1, 2, 3, 9.20-9.23, 10, 15

EXAM 2

Heating, Cooling, Lighting
Chapter: 16

Plumbing, Electricity, Acoustics
Chapters: 3, 4

EXAM 3

Plumbing, Electricity, Acoustics
Chapters: 7, 6.

The Codes Guidebook for Interiors
Chapters: 4, 5, 6.

Building Systems for Interior Designers
Chapter: 8.