

AAI 632
Interior Architectural Systems
3 Credits
Fall Semester
Prerequisite Course(s)

Course Description:

Human comfort considerations in indoor thermal environment, air quality, ventilation, air conditioning, lighting and acoustics. Emphasis on the design applications of indoor environmental factors and the use of physical and computer modeling.

Course Overview:

The AAI 632 Interior Architectural Systems course addresses the relationship that exists between people and buildings, and between buildings and their environment. Therefore, it combines the study of physical phenomena (e.g., light, sound, etc.) that influence people's comfort and safety with the study of environmentally appropriate technologies to provide optimum indoor environmental conditions.

The course combines the three major influences on interior architectural design: aesthetic, social, and technical. This course is intended to help you to quickly test your design ideas to see if they meet basic comfort, safety, and energy/resource conservation criteria; the set of five in-class exercises and the material covered in lecture present you these criteria. Although these criteria are stated in a technical (easy-to-calculate) way, they carry with them significant opportunities for social and aesthetic development.

Some of the most health promoting ways in which people interact with building interiors involve lighting, heating, cooling, and acoustics. Interior environments are considered "successes" or "failures" in large part by how effectively they provide both the comfort and the inspiration required/desired by our senses of sight, sound, touch, smell, and taste. All these senses are involved in the harmonizing of human and building performance.

The emphasis on multiple choice, machine graded exams is in part due to the size of this class, but also to prepare you for the professional licensing or registration exams.

The AAI 632 Interior Architectural Systems course also provides you with opportunities to explore innovative environmental solutions that can help mitigate the environmental impact of buildings. This aspect of the course will place you in an advantageous position since our society as a whole are now recognizing the importance of addressing health and sustainability issues in the design professions.

I. Learning Objectives:

Upon completion of the course, students will be able to:

- apply criteria for choosing appropriate environmental control systems in early design and layout and size components of environmental control systems in small to medium scale buildings
- identify the implications of design decisions on resource consumption and environmental impact
- understand that design solutions affect and are impacted by the interface of furniture with distribution and construction systems and vertical circulation systems
- understand that design solutions affect and are impacted by distribution systems including power, mechanical, HVAC, data/voice, telecommunications, plumbing, energy, security, and building controls
- understand the principles of indoor air quality and how the selection and application of products and systems impact indoor air quality

- understand the principles of thermal design and how thermal systems impact interior design solutions
- understand the principles of acoustical design and appropriate strategies for acoustical control
- competently select and apply luminaires and light sources
- understand the principles of natural and electrical lighting design
- understand the interaction of color with materials, texture, light, form and the impact on interior environments

Compliance with Council for Interior Design Accreditation (CIDA) Professional Standards
<http://accredit-id.org/wp-content/uploads/2010/03/Professional-Standards-2014.pdf>
 Standard 10. Color

Interior designers apply color principles and theories.

Standard 12. Environmental Systems and Controls

Interior designers use the principles of lighting, acoustics, thermal comfort, and indoor air quality to enhance the health, safety, welfare, and performance of building occupants.

Standard 13. Interior Construction and Building Systems

Interior designers have knowledge of interior construction and building systems. 🏠

II. Texts, readings, and instructional resources:

🏠 Required Texts:

Mechanical and Electrical Equipment for Buildings, 11th Ed. by Grondzik, Kwok, Stein, and Reynolds

Ductulator®Trane (<http://www.trane.com/bookstore>)

🏠 Recommended Texts:

The Architect's Studio Companion: Rules of Thumb for Preliminary Design, 5th Ed. by E. Allen and J. Iano

"MEEB" (11th Edition of Mechanical and Electrical Equipment for Buildings)

"SC" (5th Edition of The Architect's Studio Companion)

III. Assignments, evaluation procedures, and grading policy

🏠 Academic Requirements:

Required and Recommended Readings:

"MEEB" (11th Edition of Mechanical and Electrical Equipment for Buildings).

"SC" (5th Edition of The Architect's Studio Companion).

Readings should be done before the lecture indicated (T = Tuesday and R = Thursday).

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| WEEK 1: | R | MEEB Sections 24.1 to 24.3 (pp. 1085-1123). |
| WEEK 2: | T | SC pp. 263-309 and 311-325. |
| | R | MEEB Sections 4.1 and 4.2 (pp. 89-104). |
| WEEK 3: | T | MEEB Sections 5.1 and 5.2 (pp. 116-120) and Sections 8.1 to 8.3 |
| | R | MEEB Sections 9.1 to 9.5 (pp. 325-331) and Section 10.1 |
| WEEK 4: | T | MEEB Section 10.2 (pp. 393-401), Section 10.4 and Section 10.5 |
| | R | Review MEEB Section 9.1 to 9.8 (pp. 325-374). |
| WEEK 5: | T | Review MEEB Sections 10.1 to 10.7 (pp. 377-454). |
| | R | No Readings Assigned (Field Trip). |
| WEEK 6: | T | No Readings Assigned. |

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| | R | MEEB Sections 20.1 to 20.3, 21.1 to 21.3, and 21.7 |
| WEEK 7: | T | MEEB Sections 20.4 to 20.8 (pp. 876-907). |
| | R | MEEB Sections 21.9 to 21.12 (pp. 974-997). |
| WEEK 8: | T | MEEB Sections 22.1 and 22.2 and Section 22.4 |
| | R | MEEB Sections 22.5 to 22.9 (pp. 1018-1063). |
| WEEK 9: | T | All the readings listed above will be included in the Midterm Exam. |
| | R | MEEB Chapter 17 (pp. 739-765). |
| WEEK 10: | T | MEEB Sections 18.1 to 18.10 (pp. 767-782). |
| | R | MEEB Sections 18.11 to 18.18 (pp. 782-795). |
| WEEK 11: | T | MEEB Sections 19.1 to 19.24 (pp. 797-843). |
| | R | No Readings Assigned. |
| WEEK 12: | T | No Readings Assigned (Veterans Day Recess). |
| | R | MEEB Sections 11.1 to 11.14 (pp. 467-481). |
| WEEK 13: | T | MEEB Sections 12.1, 12.2 and 12.7 to 12.26 |
| | R | MEEB Chapter 13 (pp. 563-586). |
| WEEK 14: | T | MEEB Sections 14.1 to 14.9 (pp. 587-602). |
| WEEK 15: | T | MEEB Sections 15.18 to 15.24 (pp. 660-673). |

Administrative Requirements

Evaluation of student performance:

Letter Grade Description:

A Superior: Represents comprehensive excellence. Not only does the work fulfill all requirements in an excellent and professional manner, but goes beyond the given requirements aiming at standards higher than requested. The student is an active and engaged participant in all class activities and intellectual progress and development have been demonstrated by the timely preparation of thoughtful work on a regular basis. This work is of a quality that is instructive to the teacher and exemplary to the rest of the class and sets a standard for the exercise and/or the course.

B Above Average: Represents work that can be distinguished as being of truly "good" quality. The work is free of significant flaws, is comprehensive in scope and exceeds all minimum requirements. The student is an active and engaged participant in all class activities and intellectual progress and development have been demonstrated by the timely preparation of work on a regular basis. This work is of a quality that is exemplary for the exercise and/or the course.

C Average: Represents satisfactory and average performance. The work is free of major flaws, is comprehensive in scope, and meets all minimum requirements. Intellectual progress and development have been demonstrated by the timely preparation of work on a regular basis. The student and instructor can take "satisfaction" in the average resolution of the exercise and/or course.

D-F Failing: Represents substandard work that is not passable. The work has not fulfilled requirements, or has not been completed on time, or does not appropriately address the issues raised by the exercise and/or course and is unacceptable.

I Incomplete: An "incomplete" on a project can only be given in exceptional cases in which failure to complete the assignment is a result of illness or injury requiring a visit to a doctor, a death in the immediate family, military or legal obligations, or other equally serious reasons that can be documented in acceptable written form (such as medical records or legal notification). When possible, all outstanding circumstances that might impact the completion of a project should be brought to the instructor's attention in advance

of the class(es) that may be missed. In addition, documentation for excused absences must be provided no later than the third class meeting following the event or the absence(s) will be counted as unexcused and no Incomplete can be given. All incomplete work is subject to late penalties as per the instructor's policy.

An "incomplete" in a course is only given in exceptional cases where there is/was a serious excusable reason for not completing course requirements (see above). The quality of work in the course up to that point has been satisfactory and passing (see Academic Policies section of the Undergraduate Catalog for further details).

Instructors are permitted to assign + or - to grades. However, there is no grade of "A+" within these guidelines.

School of Architecture Grading Policy

Any course required for a major in which a grade of C+ or less is received for a graduate level course, the course must be repeated with an earned grade of B- or above.

Your "basic grade" is determined as follows:

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| In-class worksheets (five individual exercises) | 40 points |
| Midterm Exam | 20 points |
| Comprehensive Final Exam | 40 points |
| Total | 100 points |

Grading Scale:

The university +/- grading scale will be used in this course. The following standard cutoffs will be used to determine your final "basic grade":

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|--------|-------|----|
| 93.3 + | | A |
| 90.0 + | | A- |
| 86.7 + | | B+ |
| 83.3 + | | B |
| 80.0 + | | B- |
| 76.7 + | | C+ |
| 73.3 + | | C |
| 70.0 + | | C- |
| 66.7 + | | D+ |
| 63.3 + | | D |
| 60.0 + | | D- |
| < 60 | | F |

In-class Worksheets:

The five worksheets will be graded "Pass/No Pass". In order to obtain the 40 points assigned to the in-class Worksheets you have to:

- Turn in the completed worksheets at the end of the class in which they were assigned. Incomplete or late submissions (submissions are only accepted within 4 hours of the due date) will result in a grade reduction of 2 points per late worksheet. Submissions made after 4 hours of the due date will not be accepted and the worksheet will receive a "No Pass" grade.
- Receive a "Pass" grade in all five worksheets. You will only have one opportunity to resubmit the worksheet after receiving a "No Pass" grade. Each worksheet having a "No Pass" grade after resubmission will result in a grade reduction of 8 points.

- Turn in your five worksheets in a binder. Failure to submit the binder at the end of the semester will result in a final grade reduction of 10 points.

Exams:

The following information rules the midterm exam and the comprehensive final exam:

- Exams will be given on a scheduled basis; make-ups will not be provided except in the case of a valid medical condition or any of the situations described in the "UNLV Policy" section of this syllabus.
- Exams will cover all assigned readings and lecture presentations.
- Exams will be open book/open notes having a multiple-choice format.

Your Modified Grade:

Your basic grade may be lowered depending on your performance and participation in the course. Please read all the rules described on this section, as they can affect your final grade!

A. You can lower your basic grade:

By having two unexcused absences to the class, in this case your final "basic grade" will drop 1/3 of a letter grade (e.g., from "C-" to "D+").

By having three unexcused absences to the class, in this case your final "basic grade" will drop by one letter grade (e.g., from "C" to "D").

B. You can fail this class by any of the following reasons:

- Having more than three unexcused absences to the class.
- Missing any of the exams without an excuse acceptable to the instructor.

IV. Course Schedule:

1. Introduction
2. Fire safety, egress and vertical transportation
3. Building core
4. Thermal comfort
5. HVAC design principles
6. HVAC design principles
7. HVAC systems
8. Heating load calculations
9. Cooling load calculations
10. HVAC system layout
11. Water and architecture
12. Water supply systems
13. Wastewater systems
14. Alternative supply and wastewater systems
15. Water budget calculations
- MIDTERM EXAMINATION
16. Sound and perception
17. Sound transmission
18. Room acoustics
19. Auditoria design
20. Room acoustics calculation
21. Principles of light and perception
22. Electric lighting sources

23. Electric lighting design guidelines
 24. Emerging trends and issues in lighting
 25. Zonal cavity method lighting calculation
- COMPREHENSIVE FINAL EXAMINATION

V. Standard Provost's Statements

<http://www.unlv.edu/provost/policies-forms#P>

Academic Misconduct—Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility, and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling at UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the *Student Academic Misconduct Policy* (approved December 9, 2005) located at: <https://www.unlv.edu/studentconduct/student-conduct>.

Copyright—The University requires all members of the University Community to familiarize themselves with and to follow copyright and fair use requirements. You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you, nor assume any responsibility for employee or student violations of fair use laws. Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: <http://www.unlv.edu/provost/copyright>.

Disability Resource Center (DRC)—The UNLV Disability Resource Center (SSC-A 143, <http://drc.unlv.edu/>, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

Final Examinations—The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: <http://www.unlv.edu/registrar/calendars>.

Incomplete Grades—The grade of I—Incomplete—can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student's control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving "I" grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

Library Resources—Students may consult with a librarian on research needs. Subject librarians for various classes can be found here: [https://www.library.unlv.edu/contact/librarians by subject](https://www.library.unlv.edu/contact/librarians%20by%20subject). UNLV Libraries provides resources to support students' access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at <https://www.library.unlv.edu/>.

Rebelmail—By policy, faculty and staff should e-mail students' Rebelmail accounts only. Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. **Emailing within WebCampus is acceptable.**

Religious Holidays Policy—Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor within the first 14 calendar days of the course for fall and spring courses (excepting modular courses), or within the first 7 calendar days of the course for summer and modular courses, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: <http://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

Transparency in Learning and Teaching—The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information: <https://www.unlv.edu/provost/teachingandlearning>

<https://www.unlv.edu/provost/transparency>

Tutoring and Coaching—The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit <http://www.unlv.edu/asc> or call [702-895-3177](tel:702-895-3177). The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of SSC **A** (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TBE second floor.

UNLV Writing Center—One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling [702-895-3908](tel:702-895-3908). The student's Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>.

Any other class specific information—(e.g., absences, make-up exams, status reporting, extra credit policies, plagiarism/cheating consequences, policy on electronic devices, specialized department or college tutoring programs, bringing children to class, policy on recording classroom lectures, etc.)