KSU-CAED
ARCH 40102 Fourth Year Design II + ARCH 40002 Systems Design
The Integrated Design Competition [IDC - 2010]

Spring 2009 Monday, Wednesday 1:10-5:15, Friday 1:10-4:10 5+1 Credits

Faculty: Jonathan Fleming, Architect, LEED AP, Coordinator; Charles Harker, Architect; Joseph Ferut, Architect; Charles Frederick, LA; Jack Hawk, Architect; Christopher Lobas, Architect, LEED AP

Consultants: Hollee Becker, Structural Systems
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Course Abstract:

The notion of consilience has to do with the fundamental organization of knowledge as an integrated system. What we have learned thus far about sustainability is that it requires significant thought about the ramifications of designers' actions on the environment and culture. We synthesize and integrate information in order to make decisions consistent with a situation in which we find ourselves. This affinity between the notions of consilience and sustainability reveals this mode of integration as a way of thinking. (The philosophical basis for which may be investigated in Edward O. Wilson's Consilience: The Unity of Knowledge.)

In architecture, the notion of integration holds meaning for the way buildings are designed. At its surface, integration involves the arrangement of parts to make a whole; unification. Buildings are made up of a variety of systems, natural systems, structural systems, HVAC systems, assemblies of materials, electrical systems, plumbing systems, circulation systems, proportional systems and so forth. These separate systems are incomplete independent of their particular relationship with others. Anything less than thorough consideration of these relationships will result in problems that decrease the efficiency of production or operation and speed deterioration of building quality. A building's durability and flexibility may be improved when designers effectively resolve the relationships among systems. In the book, Integrated Buildings, Leonard M. Bachman categorizes notions of integration in building as follows:

Physical integration – how components and systems share space
Visual integration – how individual elements share expressive qualities to form a total built image
Performance integration – how components share function or mandate

Integration is also a conceptual basis for meaning in architecture. Architectural meaning is tied to ways individuals in their respective cultures see the world. This meaning is connected to the ways by which work is accomplished as well as the artifacts of that production. Interaction is a central reality in the development of architecture. Mature perspective on design requires an understanding that, in building, most visions may only be realized through the work of many people, from owners to craftsmen, financiers to consultants, and that it is necessary for the architect to understand the roles and priorities of others involved in a project in order to make effective decisions that build quality into the process.

This senior level studio provides an opportunity for students to seek an understanding of architectural process including the integration of systems as the stimulus for building design. The course utilizes design and analysis problems to study the impact of detailed technical considerations of building systems, market demands and building-use criteria on building organization, expression and detailing. The course intends to advance student design abilities through emphasis on the design development process. The objective is for students to formulate well-conceived design solutions, integrating base knowledge from prior coursework. The student must demonstrate their understanding of the interrelationships of systems. Additionally, a significant aspect of the learning experience is the teamwork necessary for successful completion of the project.

NAAB criteria:

Areas of primary NAAB concentration

B. 11. Building Service Systems Integration: *Understanding* of the basic principles and appropriate application and performance of building service systems such as plumbing, electrical, vertical transportation, security, and fire protection systems
B. 12. Building Materials and Assemblies Integration: *Understanding* of the basic principles utilized in the appropriate selection of construction materials, products, components, and assemblies, based on their inherent characteristics and performance, including their environmental impact and reuse.
B. 6. Comprehensive Design: *Ability* to understand, and to produce a comprehensive architectural project that integrates the following SPC: A2; A3; A4; A5; A8; B1; B2; B3; B4; B5; B7; B8; and B9.
C. 1. Collaboration: *Ability* to work in collaboration with others and in multidisciplinary teams to successfully complete design projects.

Areas of secondary NAAB concentration:

A.1. Communication Skills: *Ability to* read, write, speak and listen effectively.
A. 2. Design Thinking Skills: *Ability to* raise clear and precise questions, use abstract ideas to interpret information, consider diverse points of view, reach well-reasoned conclusions, and test alternative outcomes against relevant criteria and standards.
A. 3. Visual Communication Skills: *Ability to* use appropriate representational media, such as traditional graphic and digital technology skills, to convey essential formal elements at each stage of the programming and design process.
A.4. Technical Documentation: *Ability* to make technically clear drawings, write outline specifications, and prepare models illustrating and identifying the assembly of materials, systems, and components appropriate for a building design.
A.5. Investigative Skills: *Ability to* gather, assess, record, apply, and comparatively evaluate relevant information within architectural coursework and design processes.
A. 7. Use of Precedents: *Ability* to examine and comprehend the fundamental principles present in relevant precedents and to make choices regarding the incorporation of such principles into architecture and urban design projects.
B. 2. Accessibility: *Ability* to design sites, facilities, and systems to provide independent and integrated use by individuals with mobility, sensory, physical and cognitive disabilities.
B. 3. Sustainability: *Ability* to design projects that optimize, conserve, or reuse natural and built resources, provide healthful environments for occupants/users, and reduce the environmental impacts of building construction and operations on future generations through means such as carbon-neutral design, bioclimatic design, and energy efficiency.
B. 4. Site Design: *Ability* to respond to site characteristics such as soil, topography, vegetation, and watershed in the development of a project design.
B. 5. Life Safety: *Ability* to apply the basic principles of life-safety systems with an emphasis on egress.
B. 8 Environmental Systems: *Understanding* the principles of environmental systems' design such as embodied energy, active and passive heating and cooling, indoor air quality, solar orientation, daylighting and artificial illumination, and acoustics; including the use of appropriate performance assessment tools.
B. 9. Structural Systems: *Understanding* of the basic principles of structural behavior in withstanding gravity and lateral forces and the evolution, range, and appropriate application of contemporary structural systems.
B. 10. Building Envelope Systems: *Understanding* of the basic principles involved in the appropriate application of building envelope systems and associated assemblies relative to fundamental performance, aesthetics, moisture transfer, durability, and energy and material resources.

Areas of tertiary NAAB concentration:

A. 8. Ordering Systems Skills: *Understanding* of the fundamentals of both natural and formal ordering systems and the capacity of each to inform two- and three-dimensional design.
A. 6. Fundamental Design Skills: *Ability to* effectively use basic architectural and environmental principles in design.
C. 2. Human Behavior: *Understanding* of the relationship between human behavior, the natural environment and the design of the built environment.
C. 4. Project Management: *Understanding* of the methods for competing for commissions, selecting consultants and assembling teams, and recommending project delivery methods.
C. 5. Practice Management: *Understanding* of the basic principles of architectural practice management such as financial management and business planning, time management, risk management, mediation and arbitration, and recognizing trends that affect practice.
C. 7. Legal Responsibilities: *Understanding* of the architect's responsibility to the public and the client as determined by registration law, building codes and regulations, professional service contracts, zoning and subdivision ordinances, environmental regulation, and historic preservation and accessibility laws.

Outcomes: *also see architectural drawing performance criteria*

Project Management
- Prepare and manage project and time with the goals of efficiency and productivity
- Effectively work in team collaboration and coordinate efforts focused on particular goals
- Coordinate and produce a set of design development drawings

Overall Architectural Integration Concepts
- **Synthesis of previous student course work**
- Ability to systematically critique building organizations and systems
- Ability to integrate the design of multiple systems in a building project
- Significant understanding of the relationships among systems, for example, ways exterior wall assembly decisions impact building HVAC systems or structural sizing or ways HVAC distribution may impact building efficiency
- Ability to integrate interior systems in a detailed space design

The Context of Architecture
- Integration of physical context as an influencing factor in building design process
- Integration of historical context as an influence in building design process
- Integration of economic context as an influence in building design process

The Regulatory Context
- Ability to apply and design with the International (Ohio) Building Code to inform all aspects of building design

Knowledge of and ability to apply ADAAG design guidelines in the design of space and egress
Ability to utilize logic in understanding market constraints and how these affect project build-out

Architectural Tools
Further develop all aspects of architectural representation
Develop proficiency in application of computer-aided design technology especially in the use of Revit
Develop advanced graphic presentation skills

Structural
Ability to define and organize a building structure including lateral resistance
Ability to preliminarily size structural systems
Understanding of the organization of structural drawings and tables
Ability to use computer modeling to analyze structural designs

Mechanical
Ability to design distribution systems for building ventilation, heating and cooling including sizing the system using rules of thumb, load calculation and computer programs
Ability to design distribution systems for perimeter heating
Ability to effectively layout mechanical rooms for maintenance and access
Ability to effectively layout air distribution systems in build-out projects

Plumbing
Ability to allocate appropriate space for plumbing systems
Ability to develop water supply, soil and vent systems, made evident in system axons or risers
Ability to design roof drainage systems
Application of principles of use and distribution of wet columns

Electrical
Introduction to the organization of basic electrical systems in large-scale buildings through the execution of riser diagrams and distribution plans
Understanding of contextual issues and the allocation of space on electrical systems layout
Understanding of maintenance and access on electrical room layouts including emergency generation
Ability to integrate lighting and power systems in design

Building Skins
Ability to design and detail wall systems
Ability to employ appropriate R and U values in the design of attractive buildings for climate
Ability to understand and implement a comprehensive energy strategy as relates to exterior wall design
Ability to integrate building skin design with mechanical, electrical and structural systems

Logistics:

Consulting Faculty: Consultants may be contacted via e-mail. Consulting faculty will be available during studio hours on selected days/dates, see the syllabus for schedule check with the KSU faculty to confirm specifics. Consultants may or may not circulate through the studio – it is the student's responsibility to seek consulting assistance / criticism. Consultants will have a defined location within the studio and will meet with individual sections as required.

Class meetings: University scheduled meeting times; Monday, Wednesday, and Friday include lectures, seminars, group and individual criticism these times may be augmented with additional lectures, field trips and juries. As some meetings may, by necessity, be held outside the university scheduled times, every effort will be made to accommodate the competing demands for student time.

Building Hours: Students are required to comply with the university established building hours of operation.

Building and Equipment Maintenance: Students are required to maintain the studio and class areas in conformance with fire safety, health regulations and codes and to maintain a "professional working environment". These requirements include: not overloading electrical circuits, not accumulating waste materials and not blocking exit access pathways.

Miscellaneous damage from activities such as cutting and spray-painting directly on desk tops/ floor will not be tolerated. Utilize the spray booth and cutting mats. Infractions will be reported to the student conduct board and other appropriate authorities.

In the event additional trash receptacles, plastic bags, brooms, etc. are needed to keep the studio in an acceptable manner, please notify the studio faculty or the school director. Students are required to clean their respective studio areas weekly and maintain the studio in a presentable manner.

School Policy: As a reminder, the classrooms, studio, offices and hallways are non-smoking areas and the use of radios/TV/CD/DVD, etc…at any time is discouraged and permitted only at the faculty's discretion and only when using headphones. Clarify the use of the above with the individual studio faculty. **Refrigerators, microwaves, coffeemakers, personal lounge furniture (couches etc…) are not allowed in the studio. Alcohol and drugs are strictly prohibited in studios. See studio policy.**

Computer System Policies, Rules and Responsibilities: See CAED website
The CAED does not condone or support the use of unlicensed/illegal software.

Course Accessibility: In accordance with University policy, Regarding Students with Disabilities (Revised 6/01/07) University policy 3342-3-01.3 requires that students with disabilities be provided reasonable accommodations to ensure their equal access to course content. If you have a documented disability and require accommodations, please contact the instructor at the beginning of the semester to make arrangements for necessary classroom adjustments. Please note, you must first verify your eligibility for these through Student Accessibility Services (contact 330-672-3391 or visit www.kent.edu/sas for more information on registration procedures).

Grade Weighting:

	Building analysis	site analysis	midterm	preliminary sub-comp	substantial completion	final submittal	presentation	Systems grade	final grade
studio 5	5	5	15	10	10	25	15	15	100
systems 1 credit	35	5	10	5	5	40			100

Evaluation: Interim, final project and final course grades will reflect the faculty's assessment of the students' performance on the problem issued and will include communication skills, (written, drawn and verbal) and participation in class activities. Students should note that inefficiency in graphic communication will negatively impact your grade. Additionally, graphic efficiency will save printing costs. Faculty and consultants grade each submission in a thorough process.

No assignment, interim or final, will be accepted without a valid excuse after the date and time due. Incomplete projects must be submitted on the due date. Time due is at the beginning of class – 1:10pm unless otherwise stated. Students must submit all required materials in a timely manner.

During the semester, minimum requirements for interim and final submissions will be identified. **Submission of minimum requirements does not assure a passing grade.** It is recognized that both the objective criteria and subjective issues of concept and quality standards are critical factors in the assignment of grades. Additionally, students will submit a log of their areas of responsibility within the team structure of the project as a part of their cover sheet submittal. Grades for each team member are not necessarily the same; grades may differ based on individual project responsibilities, including effort or quality of the work or other determinants at the faculty's discretion. Projects will be team evaluated by faculty and consultants. Grades issued by consultants and each fourth year faculty member will be factored into student grades.

The design process will be evaluated constantly on a class by class basis. This evaluation will include several parameters, some of which follow: Student ***initiative*** involves the intense, active, self-critical pursuit of your ideas and the efficiency and consistency of work effort. The use of ***theoretical knowledge*** including history and conceptual design theories should be present in the work. ***Research*** includes collection, documentation, synthesis and critical analysis. ***Decision making*** includes the appropriateness and logic of parti and systems selection, the integration of systems, form, spatial order, creativity, comprehension of both abstract and real dimensions of problems. ***Presentation*** includes the care and crafting of model and drawings, the organization of information in logical frameworks, written and verbal presentation of ideas. ***Outcomes*** outlined on the previous page will serve as primary basis for grade determination.

Texts/Reference Material:

Integrated Buildings: The Systems Basis of Architecture. **Leonard R. Bachman. John Wiley and Sons. ISBN 0-471-38827-0**
Whole Building Design Guide - www.WBDG.org
Ohio or International Building Code, (OBC)
Site Analysis: Linking Program and Concept in Land Planning and Design. James A. LaGro. John Wiley and Sons
The Architect's Studio Companion – Technical Guidelines for Preliminary Design. Allen and Iano. John Wiley and Sons
Building Construction Illustrated. Francis Ching. John Wiley and Sons
Building Codes Illustrated. Francis Ching. John Wiley and Sons
LEED Reference Guide, Version 2.2 USGBC [reference in library] www.usgbc.org
http://www.aia.org/cote/
HOK Guide to Sustainable Design. Mendler; John Wiley and Sons, January 2000
Bioclimactic Skyscraper. Yeang; Elipsis, London, April 2000
Fundamentals of Building Construction: Materials and Methods. Third Edition. Edward Allen.
The Philosophy of Sustainable Design. Jason McLennan
Environmental Technology I and II text books *MEEB*
Structures I, II [and III] text books
Sun, Wind and Light, G.Z. Brown

American with Disabilities Act, (ADAAG) Accessibility Guidelines for Buildings and Facilities, The Federal Register, 1994
www.usdoj.gov/crt/ada/adahom1.htm
National Renewable Energy Laboratory www.nrel.gov
Green Spec http://greenspec.com