

On the Need to Improve Architecture Students' Knowledge of Cities, Urban Design, and Place-Making in an Urbanizing World

November 2, 2017

Growing and Threatened Cities in an Age of Urbanization and Climate Change

In the building boom and decades of urban renewal following World War II, architects contributed extensively to the modernization and transformation of cities around the world. In hindsight, many of the theories and drastic changes made to cities then are now considered mistakes. Over the past half century, we have accordingly shifted away from anti-urban philosophies to an understanding of the virtues of urban life and compact cities, and we understand that cities are complex systems with highly sophisticated ecologies connecting people and places in remarkable and subtle ways. Whereas an earlier generation left the cities for the new suburbs, today their children and grandchildren seek to reoccupy their grandparents' city. Indeed, the demand is so great, they are pushing out the children and grandchildren of those who, a generation or two ago, missed the suburban boom. Debates about gentrification, overbuilding, affordability, and inadequate infrastructure dominate today's discourse.

Meanwhile, other parts of the world are urbanizing for the first time. Repeating patterns seen one hundred fifty years ago in industrialized nations, people are leaving rural villages for factory work and life in newly planned cities and slums. Whether this urbanization takes the form of compact cities, exurban sprawl, or more informal settlements, the human population is transforming geographically and culturally. Today, our world finds more than 1 billion people living in slums alone. By 2050—when our students are at the peak of their careers—two-thirds of the global population will live in urban areas.¹ Will they be prepared to contend with these phenomena?

Exacerbating global demographic shifts, the threat of sea level rise on coastal cities makes population shifts alone pale in comparison. Currently an estimated 600 million people live in low-elevation coastal zones potentially impacted by flooding, and, with the combination of population growth and sea level rise, this figure could rise to well over a billion people in coming decades.² As observed by NASA scientists more than fifteen years ago, eleven of the world's fifteen largest cities are located in potentially threatened coastal areas, and in the US more than half of the population lives near the coast.³ The growing number of flooding episodes in US cities indicates that climate change is already happening.⁴ Moreover, since many of these cities are expanding without regard

¹ See United Nations, *World Urbanization Prospects, 2014*, <https://esa.un.org/unpd/wup/publications/files/wup2014-highlights.Pdf>

² Neumann B, Vafeidis AT, Zimmermann J, Nicholls RJ (2015) Future Coastal Population Growth and Exposure to Sea-Level Rise and Coastal Flooding - A Global Assessment. *PLoS ONE* 10(3): e0118571. <https://doi.org/10.1371/journal.pone.0118571>

³ V. Gornitz, "Coastal Populations, Topography, and Sea Level Rise," *NASA Goddard Institute for Space Studies Science Briefs*, Mar. 2000, https://www.giss.nasa.gov/research/briefs/gornitz_04/.

⁴ Justin Gillis, "Flooding of Coast, Caused by Global Warming, Has Already Begun," *New York Times*, Sept. 3, 2016, <https://www.nytimes.com/2016/09/04/science/flooding-of-coast-caused-by-global-warming-has-already-begun.html>.

for their terrain and ecologies, the damages wrought by weather events are growing in scale and cost.

We have seen the simulations of flooded cities and we are familiar with such high-profile projects as Bjarke Ingels and Rebuild by Design's post-Hurricane Sandy "BIG U" storm-surge protection proposal for Manhattan.⁵ Although the potential impacts and costs of flooding, adaptation, and relocation are staggering, we can expect our students—and all those professionally concerned with the built environment—to be involved in such large-scale projects in the future.

Even without demographic trends and the threats of coastal inundation, many urban areas are expanding unsustainably in the form of use-separated, low-density, and car-dependent environments. As a result, by 2030, cities are expected to nearly double in physical extent—an increase equivalent to what it has taken the beginning of human history until just recently to achieve.⁶ These places need immediate attention if infrastructure lock-in—and concomitant commuting, emissions, and maintenance disasters—are to be avoided.

Meanwhile, in places where what was once called "traditional" urbanism has been re-valued, an urban renaissance has contributed to many architectural practices working on large-scale design projects. The economies of finance and professional work yield larger projects, and consequently today's design projects often have a significant impact on their immediate contexts. Hospital projects, for example, are often not single buildings but campuses that transform urban neighborhoods. Large-scale retail, institutional, and residential projects are similarly urban design-oriented in their scope and scale.

To remain relevant in a changing world, architects need to understand the challenging social, environmental, and economic implications of these patterns. They need to be able to explain their impacts on communities and clients, and to be able to help design solution. To be prepared for the work of such challenges and practices today, architecture students need to know the fundamentals of urbanism and urban design.

Indeed, architecture students now need to be knowledgeable in these areas to be competitive with their colleagues from city and regional planning and landscape architecture; the American Planning Association has recently created an urban design certification, and, as a discipline, landscape architecture has developed timely urban design-focused design practices in recent decades.⁷

However, as complex phenomena, cities transcend disciplines. In combination with the "grand challenges" that our students will face in the coming decades, it is clear that even more collaborative cooperation between disciplines will be necessary. When the first urban design degree programs were conceived and created in the 1950s and 60s, they were imagined as post-

⁵ See <http://www.rebuildbydesign.org/our-work/sandy-projects>

⁶ Fragkias, M et al. (2013). A Synthesis of Global Urbanization Projections. In T. Elmqvist et al (Eds.), *Urbanization, Biodiversity and Ecosystem Services: Challenges and Opportunities*. Netherlands: Springer.

⁷ See <https://www.planning.org/asc/urbandesign/>. For the American Society of Landscape Architects' urban design professional practice network, see www.asla.org/urban. See, for example, V. Gintoff on landscape urbanism, <http://www.archdaily.com/784842/12-projects-that-show-how-landscape-urbanism-is-changing-the-face-of-cities>.

professional programs where architects, landscape architects, and city planners could learn from one another and combine forces. Today, however, the number of post-professional urban design programs remains small in number, and the correspondingly small number of graduates from these programs are spread too thin to meet our grand challenges alone.

As observed in the United Nation's *New Urban Agenda*, which was adopted by 193 member states, there are many complex dimensions to our global urban challenges:

By 2050, the world's urban population is expected to nearly double, making urbanization one of the twenty-first century's most transformative trends. Populations, economic activities, social and cultural interactions, as well as environmental and humanitarian impacts are increasingly concentrated in cities, and this poses massive sustainability challenges in terms of housing, infrastructure, basic services, food security, health, education, decent jobs, safety and natural resources, among others.⁸

At the same time, the *New Urban Agenda* moves beyond the problems of urbanization and focuses on cities and well-designed urban form as solutions. It foregrounds the critical role of space and place: how a well-planned and well-designed built environment can help create a more sustainable world. It recognizes that urban form, infrastructure, and building design are among the greatest drivers of cost and resource efficiencies and that the design of urban space can promote social cohesion. And it commits concretely to (1) leveraging the agglomeration benefits of well-planned urbanization; (2) reinvigorating long-term, integrated urban design to optimize urban form; and (3) improving capacity for urban design including the provision of capacity building and training.⁹

The implementation of these commitments, and other sustainable development goals adopted by a wide range of institutions and municipalities, will provide career-defining opportunities for our students. To prepare them, they need foundational knowledge about urbanism and urban design in all of the design fields— but especially in architecture. And our students' contributions to addressing the challenges of their future will begin with basic knowledge of urbanism and urban design in their professional education.

How Our Architecture Students are Currently Prepared for the Future

Despite extensive global urbanization and the growing threat to hundreds of millions of people living in coastal areas around the world, our students are not well prepared to assume leadership positions in these critical areas of knowledge and practice. Some architecture educators may be teaching their students about urbanism and urban design, but this coursework is ad hoc, and not encouraged by or validated by educational standards.

Currently, the curricular/pedagogical requirements for architecture students in National Architectural Accrediting Board (NAAB) accredited programs are weak in the area of urban design, urbanism, and place-making. With only a few references to urban context and urban design in Student Performance Criteria (SPC), attention to these critically important subjects in student learning objectives— while somewhat improved in the 2014 Conditions— remains disjointed and inadequate to their importance. (See Appendix 1)

⁸ See http://nua.unhabitat.org/uploads/DraftOutcomeDocumentofHabitatIII_en.pdf

⁹ Ibid.

In order to responsibly work in and design for complex communities and places, whether urban or suburban, our future architects need consistently delivered and required coursework in urbanism and urban design. Given the inestimable importance of understanding urban contexts for construction today, and to prepare for what the future may bring, this should take the form of a *new SPC on Urbanism and Urban Design*.

Before delving further into the current educational requirements and a proposal for change, it should be noted that other countries' educational requirements are specific about the need for architecture students to understand urban design and urbanism. Some are listed below, including the recently adopted Canadian SPC A6, Urban Design:

Canadian Architectural Certification Board (CACB) Conditions and Terms for Accreditation:

A6. Urban Design. "The student must demonstrate an *ability* to analyze and respond to the larger urban context where architecture is situated; its developmental patterning and spatial morphologies; the infrastructural, environmental, and ecological systems; to understand the regulatory instruments that govern this context; the broader implications of architectural design decisions on the evolution of cities; and the impact of urbanism on design" (p. 16).¹⁰

International Union of Architects Charter for Architectural Education:

The International Union of Architects Charter for Architectural Education and Validation System is clear that architecture students must have "adequate knowledge of urban design" (p. 6), and an "awareness of the history and practice of landscape architecture, urban design..." (p. 7).¹¹

Royal Institute of British Architects:

Adopting aspects of the UIA Charter for Architectural Education, the Royal Institute of British Architects' Validation Criteria also indicates that architecture students must have "Adequate knowledge of urban design" (pp. 60, 70).¹²

Diplome d'etat d'architecte (DEA), France:

The French DEA states that that holder of the degree is able to "conceive and realize projects in the areas of architecture, urbanism [*de l'urbanisme*], and landscapes" and is able to "participate in the conception and execution of architectural, urban design [*projets urbains*], and landscape projects." It also states the degree holder is "able to design quality architectural projects that respond to both aesthetic and technical requirements respecting the planning process through mastery of tools and concepts and by mobilizing knowledge of the history and theories of architecture; technology, arts and related humanities; fine arts; and urbanism."¹³

¹⁰ Canadian Architectural Certification Board, CACB Conditions and Terms for Accreditation for Professional Degree Programs in Architecture, 2017 edition, <http://cacb.ca/en/cacb-accreditation/>

¹¹ See <http://www.uia-architectes.org/sites/default/files/charte-en.pdf> and http://www.uia-architectes.org/sites/default/files/DOCVALID_EN_2014_0.pdf

¹² <https://www.architecture.com/RIBA/Becomeanarchitect/Assets/Files/ValidationProcedures2011-SECONDREVISION2MAY2014.pdf>

¹³ Le Répertoire National des Certifications Professionnelles (RNCP), Diplôme d'état d'architecte, <http://www.rncp.cncp.gouv.fr/grand-public/visualisationFiche?format=fr&fiche=24907>

The Current Educational Requirements in Detail

The current 2014 NAAB Conditions for Accreditation guide the curriculum of all NAAB-accredited programs in the US and abroad in the form of “Student Performance Criteria” (SPC).¹⁴ The Conditions, along with their educational standards, will be updated again in 2020, making this a critical opportunity to make an overdue change.

Not long ago, architects were concerned exclusively with the limited boundaries of the building site. Today, the 2014 SPCs (see Appendix 1) make reference to architecture students working with “urban design projects” in SPC A6. This educational requirement, SPC A6, Use of Precedents, is concerned with the “*Ability* to examine and comprehend the fundamental principles present in relevant precedents and to make informed choices about the incorporation of such principles into architecture and **urban design projects**.” But when and where do architecture students learn anything about urban design? Such knowledge and abilities are assumed without a foundation of coursework for learning these. There is no supporting requirement for students to learn about urban design.

The 2014 SPCs also make reference to “people, place, and context” (as a general knowledge area)... “social and spatial patterns” (A8)... “urban context and development patterning” (B2)... “historical fabric” (B2)... and “site conditions” (B1, C3).

More specifically, the introduction to Realm A, Critical Thinking and Representation, mentions “**comprehending people, place, and context**” (p. 15). But is this knowledge adequately developed in the SPCs that follow? As noted above, A6 alludes to urban design curriculum that does not exist. SPC A7, History and Global Culture, was significantly changed in 2009 and references to urban design case studies were removed. Now, despite being extremely broad, this SPC A7 does not refer to place, landscapes, or urban contexts.

The new SPC A8, Cultural Diversity and Social Equity, addresses critical issues— and makes notable reference to “**social and spatial patterns**” (p. 16). However, the social and spatial patterns that are specific to discrete cultures and groups should be understood within the larger context of urbanism and urban design.

Turning to Realm B: Building Practices, Technical Skills, and Knowledge, we find B1, Pre-Design and B2, Site Design. Historically, B1 and B2 were respectively concerned with programming and the building site, as suggested by the heading title that refers to practices and technical skills. Today, the 2014 Conditions make reference to “**an analysis of site conditions (including existing buildings)**” in B1, Pre-Design, and to “**urban context and development patterning**” and “**historical fabric...**” in B2, Site Design. These are notable improvements over the 2009 Conditions, when Site Design (then B4) was narrower in scope. However, the revised and improved Site Design learning objective still does not charge students with the goal of learning fundamentals of urban design or reading canonical texts of urbanism or urban theory.

¹⁴ See <http://www.naab.org/accreditation/program-resources/current-conditions-and-procedures/>

Lastly, in Realm C, Integrated Architectural Solutions, we find another reference to “site conditions” in C3, Integrative Design. And in Realm D, Professional Practice, we find a relevant concern for “the need to act legally, ethically, and critically for the good of the client, society, and the public.”

The Need to Improve Students’ Knowledge of Urbanism and Urban Design

At its heart, the basis of this proposal is that in order to act for the good of the client, society, and the public, our future architects need to know more about urbanism and urban design. On a consistent basis, they need coursework where they will be asked to read canonical works of urban theory, and they need coursework where they will learn how to design the spaces between buildings as well as the spaces within buildings.

Simply stated, the understanding of urbanism, urban design, and place is fundamental to architectural design. Buildings exist in real places and architects must be trained as students to understand the places where they will work and design in terms of theory and practical skills. In its history, the architecture profession has suffered from inadequate knowledge about urbanism and cities; the general public today would no doubt be surprised that architecture students are not consistently learning about this history or the lessons drawn from it.

Similar to the architecture culture of earlier decades, the current educational requirements do not adequately conceptualize the environment beyond the building site. For example, B2, Site Design, is focused on technical abilities related to shaping a building site rather than conceptual understanding or larger scale design abilities. Other SPCs that are focused on knowledge and culture (A7 and A8) are already very broad. Therefore, making existing SPCs even more broad to include urbanism and urban design understanding and ability does not seem like a good approach.

Knowledge of urbanism and urban design deserves its own SPC.

Proposed Modifications to Existing Learning Objectives

How might existing learning objectives be altered to incorporate urbanism and urban design? Although not the preferred approach, this could be done as follows, by including a charge to study theories of urbanism in A8, and by incorporating the practical aspects of urban design in B2:

SPC A8, Cultural Diversity and Social Equity, could be changed to A8 **Urbanism, Cultural Diversity, and Social Equity**. Including a focus on urbanism here could provide an overarching context for the somewhat disparate concerns of cultural diversity and social equity.

SPC B2, Site Design, could be changed to B2 **Urban and Site Design** (or B2 **Urban Design and Site Design**). Including urban design here would situate building-scaled site design within a larger context.

An Educational Objective Equal to the Seriousness of Our Circumstances

While all steps in the right direction are welcomed, ultimately the authors of this proposal believe that architectural students— and the larger publics that architects serve— must believe that it is important to have an understanding of city life and an informed ability to design at the scale of the city block and beyond. This knowledge and ability, because of its critical significance, should rise to the level of a unique learning objective.

We therefore propose a new SPC:

A.9. Urbanism and Urban Design: *Understanding* the fundamentals of urbanism, urban design, and place-making as a foundation for designing projects at various scales, responsive to people, landscapes, and sites.

Impacts of Changes to Architectural Education

Changing Student Performance Criteria has an impact on schools' and instructors' teaching schedules and architectural education overall. We are aware that there are only so many courses that can be taught in a Master of Architecture program, and that there are costs to creating and assigning new courses. However, we believe that many educators are concerned with architecture's larger context and responsibilities to the city, and already incorporate some related material into their courses. We believe that, for them, the proposed change would validate what they already know is important and justify what they are already doing. Moreover, a new SPC does not dictate how, or how extensively, such material should be taught; this would be up to the schools and the instructors. Urbanism and urban design could be taught as a seminar, or part of a seminar, or as a studio, or part of a studio. We appreciate that there may be desires to not expand recently changed educational guidelines. Nevertheless, we believe that this change is overdue.

Our Future Architects and Future Cities Begin with the Future of Architectural Education

We do not want to repeat the mistakes of the past— the mistakes of times when architects, working with a poor understanding of cities and the built environment, transformed cities in ways they later came to regret. We need to consistently teach our students the lessons learned from that history.

Nor do we want future generations— or our own students— to look back and find us failing to rise to the challenges and threats that are now before us. We cannot deny that we live in an urbanizing world. And we cannot fail to take responsibility for threats to cities that have the potential to destroy cities, entire ways of life, and perhaps even civilizations. Architecture transcends the building. To prepare our students for these current realities and their own futures, we must improve architectural education now.

Authors:

Peter L. Laurence, PhD, Clemson University School of Architecture

Andrew Rudd, UN-Habitat

Doug Kelbaugh, FAIA, University of Michigan

Ellen Dunham-Jones, Georgia Tech

With:

Peter Elmlund, Ax:son Johnson Foundation

Harrison Fraker, FAIA, UC Berkeley

Francisco Javier Rodriguez, University of Puerto Rico

Tigran Haas, PhD, KTH Royal Institute of Technology

Morgane Schwab, Ax:son Johnson Foundation

Appendix 1: The 2014 NAAB Student Performance Criteria

Student Performance Criteria shape the coursework of accredited, professional architecture degree programs. For complete text, see NAAB *2014 Conditions for Accreditation*, pages 15 to 18, <http://www.naab.org/accreditation/program-resources/current-conditions-and-procedures/>

Below, the SPCs currently most relevant to urbanism and urban design are highlighted.

PART TWO (II): SECTION 1—STUDENT PERFORMANCE—EDUCATIONAL REALMS AND STUDENT PERFORMANCE CRITERIA

The accredited degree program must demonstrate that each graduate possesses the knowledge and skills defined by the criteria below. The knowledge and skills defined here represent those required to prepare graduates for the path to internship, examination, and licensure and to engage in related fields. The program must provide student work as evidence that its graduates have satisfied each criterion.

The criteria encompass two levels of accomplishment:

- **Understanding**—The capacity to classify, compare, summarize, explain, and/or interpret information.
- **Ability**—Proficiency in using specific information to accomplish a task, correctly selecting the appropriate information, and accurately applying it to the solution of a specific problem, while also distinguishing the effects of its implementation.

II.1.1 Student Performance Criteria (SPC): The NAAB establishes SPC to help accredited degree programs prepare students for the profession while encouraging education practices suited to the individual degree program. The SPC are organized into realms to more easily understand the relationships between each criterion.

Realm A: Critical Thinking and Representation. Graduates from NAAB-accredited programs must be able to build abstract relationships and understand the impact of ideas based on the study and analysis of multiple theoretical, social, political, economic, cultural, and environmental contexts. Graduates must also be able to use a diverse range of skills to think about and convey architectural ideas, including writing, investigating, speaking, drawing, and modeling. Student learning aspirations for this realm include:

- Being broadly educated.
- Valuing lifelong inquisitiveness.
- Communicating graphically in a range of media.
- Assessing evidence.
- **Comprehending people, place, and context.**
- Recognizing the disparate needs of client, community, and society.

The accredited degree program must demonstrate that each graduate possesses the following:

A.1 Professional Communication Skills: *Ability* to write and speak effectively and use representational media appropriate for both within the profession and with the general public.

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 Investigative Skills: *Ability* to gather, assess, record, and comparatively evaluate relevant information and performance in order to support conclusions related to a specific project or assignment.

A.4 Architectural Design Skills: *Ability* to effectively use basic formal, organizational and environmental principles and the capacity of each to inform two- and three-dimensional design.

A.5 Ordering Systems: *Ability* to apply the fundamentals of both natural and formal ordering systems and the capacity of each to inform two- and three-dimensional design.

A.6 Use of Precedents: *Ability* to examine and comprehend the fundamental principles present in relevant precedents and to make informed choices about the incorporation of such principles into architecture and **urban design projects**.

A.7 History and Global Culture: *Understanding* of the parallel and divergent histories of architecture and the cultural norms of a variety of indigenous, vernacular, local, and regional settings in terms of their political, economic, social, ecological, and technological factors.¹⁵

A.8 Cultural Diversity and Social Equity: *Understanding* of the diverse needs, values, behavioral norms, physical abilities, and social and **spatial patterns** that characterize different cultures and individuals and the responsibility of the architect to ensure equity of **access to sites**, buildings, and structures.

Realm B: Building Practices, Technical Skills, and Knowledge. Graduates from NAAB-accredited programs must be able to comprehend the technical aspects of design, systems, and materials and be able to apply that comprehension to architectural solutions. In addition, the impact of such decisions on the environment must be well considered. Student learning aspirations for this realm include:

- Creating building designs with well-integrated systems.
- Comprehending constructability.
- Integrating the principles of environmental stewardship.
- Conveying technical information accurately

The accredited degree program must demonstrate that each graduate possesses skills in the following areas:

B.1 Pre-Design: *Ability* to prepare a comprehensive program for an architectural project that includes an assessment of client and user needs; an inventory of spaces and their requirements; an **analysis of site conditions (including existing buildings)**; a review of the relevant building codes and standards, including relevant sustainability requirements, and an assessment of their implications for the project; and a definition of site selection and design assessment criteria.

B.2 Site Design: *Ability* to respond to site characteristics, including **urban context and developmental patterning, historical fabric**, soil, topography, ecology, climate, and building orientation, in the development of a project design.¹⁶

B.3. Codes and Regulations: *Ability* to design sites, facilities, and systems that are responsive to relevant codes and regulations, and include the principles of life-safety and accessibility standards.

B.4 Technical Documentation: *Ability* to make technically clear drawings, prepare outline specifications, and construct models illustrating and identifying the assembly of materials, systems, and components appropriate for a building design.

B.5 Structural Systems: *Ability* to demonstrate the basic principles of structural systems and their ability to withstand gravitational, seismic, and lateral forces, as well as the selection and application of the appropriate structural system.

B.6 Environmental Systems: *Ability* to demonstrate the principles of environmental systems' design, how design criteria can vary by geographic region, and the tools used for performance assessment. This demonstration must include active and passive heating and cooling, solar geometry, daylighting, natural ventilation, indoor air quality, solar systems, lighting systems, and acoustics.

B.7 Building Envelope Systems and Assemblies: *Understanding* of the basic principles involved in the appropriate selection and application of building envelope systems relative to fundamental performance, aesthetics, moisture transfer, durability, and energy and material resources.

¹⁵ Compare with 2009 Historical Traditions and Global Culture: *Understanding* of parallel and divergent canons and traditions of architecture, landscape and **urban design** including examples of indigenous, vernacular, local, regional, national settings from the Eastern, Western, Northern, and Southern hemispheres in terms of their climatic, ecological, technological, socioeconomic, public health, and cultural factors.

¹⁶ Compare with 2009 Site Design: *Ability* to respond to site characteristics such as soil, topography, vegetation, and watershed in the development of a project design.

B.8 Building Materials and Assemblies: *Understanding* of the basic principles used in the appropriate selection of interior and exterior construction materials, finishes, products, components, and assemblies based on their inherent performance, including environmental impact and reuse.

B.9 Building Service Systems: *Understanding* of the basic principles and appropriate application and performance of building service systems, including lighting, mechanical, plumbing, electrical, communication, vertical transportation, security, and fire protection systems.

B.10 Financial Considerations: *Understanding* of the fundamentals of building costs, which must include project financing methods and feasibility, construction cost estimating, construction scheduling, operational costs, and life-cycle costs.

Realm C: Integrated Architectural Solutions. Graduates from NAAB-accredited programs must be able to demonstrate that they have the ability to synthesize a wide range of variables into an integrated design solution. Student learning aspirations for this realm include:

- Comprehending the importance of research pursuits to inform the design process.
- Evaluating options and reconciling the implications of design decisions across systems and scales.
- Synthesizing variables from diverse and complex systems into an integrated architectural solution.
- Responding to environmental stewardship goals across multiple systems for an integrated solution.

The accredited degree program must demonstrate that each graduate possesses skills in the following areas:

C.1 Research: *Understanding* of the theoretical and applied research methodologies and practices used during the design process.

C.2 Integrated Evaluations and Decision-Making Design Process: *Ability* to demonstrate the skills associated with making integrated decisions across multiple systems and variables in the completion of a design project. This demonstration includes problem identification, setting evaluative criteria, analyzing solutions, and predicting the effectiveness of implementation.

C.3 Integrative Design: *Ability* to make design decisions within a complex architectural project while demonstrating broad integration and consideration of environmental stewardship, technical documentation, accessibility, **site conditions**, life safety, environmental systems, structural systems, and building envelope systems and assemblies.

Realm D: Professional Practice. Graduates from NAAB-accredited programs must understand business principles for the practice of architecture, including management, advocacy, and the need to act legally, ethically, and critically for the good of the client, society, and the public. Student learning aspirations for this realm include:

- Comprehending the business of architecture and construction.
- Discerning the valuable roles and key players in related disciplines.
- Understanding a professional code of ethics, as well as legal and professional responsibilities.

The accredited degree program must demonstrate that each graduate possesses skills in the following areas:

D.1 Stakeholder Roles in Architecture: *Understanding* of the relationships among key stakeholders in the design process—client, contractor, architect, user groups, local community—and the architect's role to reconcile stakeholder needs.

D.2 Project Management: *Understanding* of the methods for selecting consultants and assembling teams; identifying work plans, project schedules, and time requirements; and recommending project delivery methods.

D.3 Business Practices: *Understanding* of the basic principles of a firm's business practices, including financial management and business planning, marketing, organization, and entrepreneurship.

D.4 Legal Responsibilities: *Understanding* of the architect's responsibility to the public and the client as determined by regulations and legal considerations involving the practice of architecture and professional service contracts.

D.5 Professional Conduct: *Understanding* of the ethical issues involved in the exercise of professional judgment in architectural design and practice and understanding the role of the NCARB Rules of Conduct and the AIA Code of Ethics in defining professional conduct.