National Architectural Accrediting Board, Inc.

August 24, 2016

Michael Bell, Director
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Greetings,

After reviewing the *Interim Progress Program Report* submitted by Columbia University, the National Architectural Accrediting Board (NAAB) has concluded that the IPR is accepted as having demonstrated satisfactory progress toward addressing deficiencies identified in the most recent Visiting Team Report. No further reporting is required until the Architecture Program Report (APR) is due for your next NAAB visit.

The term of accreditation stands. The next visit will be in 2021. The program is required to continue submitting an Annual Statistical Report through the ARS.

If you have any questions regarding this matter, please contact the NAAB office.

Very truly yours,

Scott C. Veazey, AIA
President

FINAL

Interim Progress Report

Columbia University

Graduate School of Architecture, Planning, and Preservation

M.Arch. [Pre-professional degree + 108 credits]

Last APR submission: September 7, 2012

Year of the previous visit: 2013

Chief administrator for the academic unit in which the program is located: Amale Andraos, Dean

Provost: John Coatsworth

President of the institution: Lee Bollinger

Individual submitting the Interim Progress Report: David Hinkle

Name of individual(s) to whom questions should be directed: David Hinkle

Current term of accreditation: 8 year term

a) Progress in Addressing Not-Met Conditions and Student Performance Criteria

A.4 Technical Documentation
2013 Visiting Team Assessment: As in the 2007 Visiting Team Report, this team did not find evidence of writing of outline specifications in any student work or assignment. The topic of specifications is discussed in a lecture in A4560 Professional Practice but the team found no evidence to demonstrate the required level of ability.

The team found evidence of wall section models prepared by students in A4111 Architectural Technology I. The rudimentary level of craft in these models was not consistent with the exceptional clarity and sophistication of computer-enabled graphics throughout the program, including details, technical diagrams, and other architectural drawings.

Columbia University, 2015 Response:

- Development of outline specifications are now reviewed with students and required as part of the final deliverables in Integrated Design: Building Scale (A4114). (See attached syllabus)
- Previous wall section exercises for A4111 have been eliminated from this early course and replaced with development of wall sections as part of the course curriculum of *Envelopes in Architecture A4113*. (See attached syllabus)
- Wall type development with respect to fire protection and egress requirements is now introduced in lecture format in A4114 and is part of the development of the comprehensive course project. (See Attached Syllabus)
- Coordination is ongoing between technology course curriculum and A4560 Professional Practice to ensure specification content is covered appropriately.

B.7 Financial Considerations
2013 Visiting Team Assessment: No evidence was found in any student course work.

Columbia University, 2015 Response:

- A4114/A4115 have incorporated budgeting templates as assignments/deliverables for comprehensive project work. Discussions on budget and influence of decisions in system selection has also been introduced at the critic level in both classes.
- Coordination is ongoing between technology course curriculum and A4560 Professional Practice to ensure financial consideration content is covered appropriately.

B.11 Building Service System Integration
2013 Visiting Team Assessment: The team did not find any evidence of student work demonstrating understanding of fire protection, plumbing, electrical, and security systems. Although coursework integrating mechanical systems is extremely comprehensive, there is no evidence except for a single lecture in the A4112 course with no associated exam questions or assignments of these systems.

Columbia University, 2015 Response:

- A4111 syllabus covers lighting and electrical systems in 2 lectures.
- A4111 syllabus covers plumbing and fire protection systems in 1 lecture.
- Electrical and plumbing system content is being introduced in the final exam requirements for the course.
- A4114 has introduced specific lectures on plumbing and fire protection system integration.
- A4114 has introduced extensive case study review lectures for 3 complete projects which demonstrate plumbing, fire protection, electrical/security systems integration concepts.

- Plumbing, Fire Protection and Electrical/Security system schematics have been incorporated into the deliverables for the A4114 project.

b. Plans for/Progress in Addressing Causes of Concern

- **Learning Culture and Society Equity**

2013 Visiting Team Comments: In practice, the GSAPP has a very productive, advanced, collaborative and continuous educational environment. There is evidence that faculty, students, administration and staff encourage values of optimism, respect, sharing, engagement, and innovation within the college.
The team verified that there is a Studio Culture Policy Document and it is included in materials given to each matriculating student but it does not address health-related issues, such as time management. The team understands that this was developed with participation of student representatives and faculty, and formally approved by the full faculty in January of 2009. However, discussions with the current students revealed no awareness of the existence or purpose of the document. There was no evidence of plans for ongoing student participation in the review, evolution and assessment of this document or the underlying policies. For this reason alone, the team finds this a cause of concern. However, the office of the dean of students does provide ongoing personal support and accommodates student input and acts as the defacto Studio Culture Policy Document.

Columbia University, 2015 Response:

Below please find our Studio Culture Statement, which now includes a statement regarding health and time management.

GSAPP STUDIO CULTURE POLICY

A dynamic and supportive studio culture is the central aspect of life at the GSAPP for both students and design faculty and the core of the learning culture. The studio environment is fundamentally collaborative, in both the formal sense of design studios such as the first semester of the second year requiring students to work in teams, and in the informal sense of students at all levels sharing skills, insights, and information. But also in the sense of faculty collaborating with students, particularly in the advanced studios. Mutual respect and shared enthusiasm drives the studio culture. Interdisciplinary work is encouraged. Faculty-to-student ratios are maintained that allow for optimal contact hours with each student. Core studio deadlines are coordinated with other core courses to avoid overload and final studio reviews and history/theory/technology assignments are staggered to minimize any overlap of deadline. Design reviews are conducted in the spirit of open debate among both faculty and students and are open to other students and visitors to the School. A comprehensive on-site computer infrastructure, installed and managed by the GSAPP, as well as on-site advanced modeling and fabrication facilities, encourage students to work in the design studios on a regular basis. Campus security allows students to feel comfortable 24 hours a day. This is supplemented with regular social activities, as well as a wide range of public, evening lectures and other events that enhance the overall GSAPP environment as a site of ongoing cultural exchange. In sum, the overall studio experience is one of the highlights of a GSAPP education. GSAPP supports its students in leading balanced lives. Students are encouraged to develop efficient and rational work habits, creating a holistic approach to work, recreation, eating habits, and rest. Students should feel free to avail themselves of the various channels at GSAPP to voice concerns and suggestions regarding studio culture.

In order to have an ongoing discussion promoting the evolution and understanding of studio culture, the Advanced Architecture Studios under the direction of Professor Juan Herreros this year includes a session entitled "Transfer Dialogues." Below is a description of the series.

Transfer Dialogues is a conversation series of the Advanced Studios at Columbia that analyzes our studio culture, and architecture discourse at large, by discussing and demystifying terms that we generally use, and often take for granted. In addressing our studio culture in this very direct way, we intend to critically inspect our protocols of work and their related agendas, and to facilitate exchanges between faculty and students. In each session, faculty panelists are invited to present the way in which their studios approach or use a selected term, as well as to act as historians, and analyze the ways in which the term has been mobilized within architecture discourse.

An open dialogue between faculty panelists and students follows the presentations. These dialogues allow students to interrogate faculty on the agendas of the different studios, as well as to discuss the relation of these agendas to the specific topics addressed, the design procedures followed, and the modes of evaluation mobilized. In addition to the dialogue series, a number of reviews are organized throughout the semester confronting pairs of studios. In them, students in each studio review the work of those in the other. These reviews seek to promote a culture of conversation within the student body, and help students to position the agenda of their studio in relation to other agendas within the field. In this way, students can elaborate their own positions, and gain the capacity to question the foundations of their own work and arguments (as well as those of others) as a necessary basis to grow as sophisticated designers and thinkers.

- **Technical Documentation**

2013 Visiting Team Comments: As in the 2007 Visiting Team Report, this team did not find evidence of writing of outline specifications in any student work or assignment. The topic of specifications is discussed in a lecture in A4560 Professional Practice but the team found no evidence to demonstrate the required level of ability.
The team found evidence of wall section models prepared by students in A4111 Architectural Technology I. The rudimentary level of craft in these models was not consistent with the exceptional clarity and sophistication of computer-enabled graphics throughout the program, including details, technical diagrams, and other architectural drawings.

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- **Financial Consideration**

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c. Changes or Planned Changes in the Program

CHANGE IN LEADERSHIP

Since GSAPP's previous accreditation visit, the School has a new Dean, Amale Andraos, appointed as of September 1, 2014. Dean Andraos has taught at numerous universities including the Princeton University School of Architecture, the Harvard Graduate School of Design, the University of Pennsylvania Design School and the American University in Beirut. Andraos is a co-founder of WORKac, a 35-person architectural firm based in New York that focuses on architectural projects which re-invent the relationship between urban and natural environments. Please see her biography included in the appendix of this report.

Vision

Dean Andraos believes that as a leader shaping the fields of architecture and the built environment, the school combines pioneering experimentation with an uncompromising engagement with the world. Located in one of the most vibrant global cities, Columbia GSAPP is a laboratory for learning that weaves together cutting edge design skills, incisive critical thinking and new forms of knowledge as students and faculty engage one another in a spirit of intellectual generosity that strives to re-imagine the future of architecture, cities and the environment.

Columbia GSAPP fosters the development of new forms of design research and scholarship to open up new territories for more meaningful practices of architecture and the design of cities. In this moment of convergence, the school draws together the geographical question of "where" with the temporal question of "when," making visible the processes of rapid urbanization in a time of climate change. We bring these questions of context to bear upon the thinking and design of everything: from the scale of a brick to that of a city, and from the design of new forms of practice to that of collaboration and exchange between the expanded disciplines at the school. This approach is reflected in the constant re- invention of the school's own environment as an experimental space for creative thinking and design, meeting and making in a lively, highly urban and energized collegial learning experience.

FACULTY HIGHLIGHTS

Since the last accreditation visit, three women faculty members have achieved tenure: Amale Andraos, Laura Kurgan, and Kate Orff.

One new full-time faculty member has been hired as an Associate Professor of Professional Practice, Craig Schwitter. Professor Schwitter now directs our Technology sequence. Please see his biography attached, as well as the entry below regarding changes to the sequence.

MELLON FOUNDATION AWARD

GSAPP was recently awarded an Andrew W. Mellon Foundation grant in the amount of $1.975 million to establish the Center for Spatial Research (CSR). Under the Directorship of Associate Professor of Architecture Laura Kurgan, the CSR "will act as a focal point linking humanities, architecture, and data science departments as well as sponsoring a series of curricular initiatives built around new technologies of mapping, data visualization and data collection."

EVENT HIGHLIGHTS

In November of 2014 we held a major conference entitled "Architecture and Representation: the Arab City," with the participation of 31 scholars from around the globe. This fall's major event is a symposium on Climate Change and the Scales of Environment. In spring 2016 we will host "Other Desires: The African City."

CAREER SERVICES

Architecture now has a full-time Career Services Officer. The Service's mission is keep GSAPP in touch with the professional world beyond Avery Hall. Events range from panel discussions, workshops and alumni networking events, to portfolio reviews and career fairs. Additionally, Career Services offers an alumni mentorship program, resume and cover letter editing, peer-to-peer portfolio review and mock interviews. The Service issues a biweekly newsletter which highlights job and internship opportunities, and events - on and off campus. GSAPP now offers an elective credit-based internship course (1.5 credits) that provides a substantive opportunity for students to practice applying their expertise and skills in a real world setting. Each spring Career Services host a Career Fair where various firms to meet and interview current students.

CURRICULUM

Technology Sequence

There have been significant improvements made to the technology course sequence at GSAAP since the last NAAB accreditation review. The technical sequence has maintained the previous 5 required courses and 1 technical elective course structure. However, course content and emphasis has been revised to reflect NAAB comments and evolving demands for teaching of technology in architecture. The new sequence looks to enhance the previous courses and add depth in areas that required more concentration. Pleases see matrix in appendix.

Environments in Architecture (A4111). This course has been repositioned to fall semester for incoming March students. It covers a wide range of environmental and mechanical, electrical, and plumbing systems discuss. Please see syllabus in Appendix.

Structures in Architecture (A4112). This course has been repositioned to the spring semester for incoming March students. It covers behavior of structures and materials.

Envelopes in Architecture (A4113). This course is a new course for 2nd year fall semester and covers envelope and curtain wall design. It builds on coursework in A4111 and A4112 and has project work coordinated with A4114. Please see syllabus in Appendix.

Integrated Design: Building Scale (A4114). This course is given concurrently with A4113 and covers comprehensive architectural integration of systems such as structure, HVAC, electrical, plumbing. It requires egress analysis and incorporates project work in envelopes from AT3 to be integrated into the comprehensive project. Please see syllabus in Appendix.

Integrated Design: Urban Scale (A4115). This course continues comprehensive architectural integration of systems but introduces a broader range of urban scale systems affecting architecture today including energy, water, transit and waste.

Professional Practice

For spring 2016 Associate Professor of Professional Practice Galia Solomonoff will be offering and Advanced Professional Practice Seminar to build on the required Professional Practice course taught by Professor Paul Segal.

d. Summary of Activities in Response to Changes in the NAAB Conditions

Columbia University, 2015 update:

Five New Perspectives

Discussion of these new perspectives in ongoing as the Dean and faculty examine how best to incorporate and develop these new perspectives in the overall curriculum.

New Conditions in Public Information

GSAPP believes it is currently compliant with these conditions regarding Admissions and Advising as well as Student Financial Information.

e. Appendix (include revised curricula, syllabi, and one-page CVs or bios of new administrators and faculty members; syllabi should reference which NAAB SPC a course addresses)

Columbia University, 2015 update:

Below please find the following:

Biography of Dean Amale Andraos
Biography of Professor Craig Schwitter
Revised Technology Curriculum Overview
Revised Technology Syllabi for Environments in Architecture, Envelopes in Architecture, Integrated Design: Building Scale

Amale Andraos is Dean of Columbia University's Graduate School of Architecture, Planning and Preservation (GSAPP) and co-founder of WORKac, a New-York based architectural and urban practice with international reach.

One of the top Ivy League schools in the US, Columbia GSAPP is home to pioneering experimentation in the fields of architecture and the built environment combined with an uncompromising engagement with the world. Located in one of the most vibrant global cities, the school fosters the development of new forms of design research and scholarship as it weaves together cutting edge design skills, incisive critical thinking and new forms of knowledge. At Columbia GSAPP, our highly diverse and global student body and faculty engage one another in a spirit of intellectual generosity that strives to re-imagine the future of architecture, cities and the environment.

Prior to becoming Dean, Andraos was an associate professor at the School and previously taught at numerous universities including the Princeton University School of Architecture, the Harvard Graduate School of Design, the University of Pennsylvania Design School and the American University in Beirut. Her recent design studios and seminars have focused on the Arab City, which has become the subject of a series of symposia entitled "Architecture and Representation" held at Studio-X Amman in 2013 and on campus in New York in the fall of 2014. Her publications include the recent *49 Cities*, a re-reading of 49 visionary plans through an ecological lens, *Above the Pavement, the Farm!*, and the forthcoming *Architecture and Representation: the Arab City*.

WORKac is focused on re-imaging architecture at the intersection of the urban, the rural and the natural. The practice has achieved international recognition for projects such as the competition-winning designs for Hua Qiang Bei Road, Shenzhen, the Centre de Conferences in Libreville, Gabon and the New Holland Island Cultural Center in St. Petersburg, the Edible Schoolyards at PS216 in Brooklyn and PS7 in Harlem, NY as well as the new office headquarters for Wieden+Kennedy, also in New York. Current projects include a new storefront for a Parking Garage in Miami, a residential conversion of a historic New York cast-iron building and a Master Plan for seven university campuses for Weifang, China in collaboration with Studio Pei-Zhu, SLAB, SCAPE. WORKac has won numerous awards including a 2015 Honor Award from the AIA NY for the Beijing Horticultural Expo Master Plan – also in collaboration with Studio Pei-Zhu, SLAB and SCAPE.

Craig Schwitter PE
Managing Principal, Buro Happold
Professor of Practice, Columbia University Graduate School of Architecture and Planning

Craig Schwitter is a managing principal at Buro Happold and an Associate Professor at Columbia University's Graduate School of Architecture, Planning and Preservation. With over 25 years of experience, Mr. Schwitter has become a leader in the engineering design of complex buildings and large scale developments that include educational, performing arts, cultural, civic, stadia, transportation, and master planning projects. Craig actively plays a hands-on role in ensuring the highest levels of client service, quality work and seamless delivery in projects from campus master plans to iconic building projects.

Education	BSCE John Hopkins University, 1989 MSCE Massachusetts Institute of Technology, 1991
Specialization	Structural Engineering and Multi-Disciplinary Building Engineering
Professional Licenses	Alabama, Arizona, Arkansas, Connecticut, Washington DC, Florida, Georgia, Indiana, Massachusetts, Maryland, Maine, Michigan, Missouri, Mississippi, North Carolina, New Jersey, New Jersey, New York, Ohio, Pennsylvania, South Carolina, Virgina, Wisconsin, Louisiana.

Academic Positions and Courses Taught

1999	*Illinois Institute of Technology School of Architecture* Courses Taught: Visiting Studio Professor
1999-2003	*Rensselaer Polytechnic Institute, School of Architecture and Dept of Civil Engineering* Distinguished Bedford Chair of Architecture and Engineering Courses Taught: Advanced Structure Tech, Structures Seminar, Capstone Studios, Bedford Travelling Fellowships
2009	*Cornell University School of Architecture* Courses Taught: Visiting Studio Professor
2010-11	*Columbia GSAAP, Real Estate Development Program* Adjunct Professor Courses Taught: *PLA 6362* Aspects of Environmental Development, *PLA6245* Fundamentals of Building Systems and High Performance Design, *PLA6362* Developing a High Performance Building
2013-4	*Columbia GSAAP, School of Architecture* Professor of Practice Courses Taught: *A4682* Advanced Energy Performance Architecture, *A4111* Architecture Technology I

GSAPP TECH SEQUENCE CURRICULUM

	Limited Technical Experience (5 Reqs / 1 Elective)	Waivers – Previous Tech nical Experience (3 Req / 3 Electives)
Year 1 | Core 1 | Fall	A4111 Environments	Elective
Year 1 | Core 2 | Spring	A4112 Structures	Elective
Year 2 | Core 3 | Fall	A4113 Envelopes / A4114 Int Des Bldg Systems	A4113 Envelopes / A4114 Int Des Bldg Systems
Year 2 | Adv 4 | Spring	A4115 Int Des Urban Systems	A4115 Int Des Urban Systems
Year 3 | Adv 5/6 | Fall/Spring	Elective	Elective

Tech Electives

URBAN SYS	SIM	VDC	BLDG SYS
Sustainable Design	Evolutionary Design	Transformable Design Methods	Modular Architecture
Man, Machine + Ind Landscape	Architectural Daylighting	Coding Integration	Advanced Curtain Wall
Sust. + Exist. Structures	Digital Detailing	Surface, Screen and Structure	Fast Place // Slow Space
Adv. Energy Performance	Acoustics	VDC and the Digital Domain	The Culture of Concrete

Columbia University
Graduate School of Architecture, Planning and Preservation

A4111: AT I, ENVIRONMENTS IN ARCHITECTURE
Environmental Systems/ MEP

Time:	Fall, Tuesday 9:30AM-1:00PM
Location:	Avery 114
Credits:	3
Instructors:	Shanta Tucker (shanta.tucker@atelierten.com)
	Office Hours: by appointment
TAs:	Chantal Marie Jahn (cmj2169@columbia.edu)
	Elizabeth Cohn Martin (elc2153@columbia.edu)

Course Overview
This course addresses the fundamentals and application of environmental control systems in buildings. Heating, cooling, ventilation, lighting, and acoustics are discussed based on the physical laws that govern the exchange of energy between building and environment and how they relate to human comfort. Electrical, plumbing, fire protection and circulation are introduced in this context as required systems to make buildings fit for occupation.

Class time will be divided into lectures, hands on introductions of software tools and quantitative methods, and guest lectures. Assignments will combine software and hand calculations in the application of the principles introduced in the lectures. Students are encouraged to apply lessons learned in this class to their studio explorations.

Educational Objectives
The goal of this course is to enable students to understand the interaction of natural and constructed environments in order to develop and quantify appropriate responses that create comfortable and efficient buildings. Through the focus of this course on the dynamic relationship of external environmental forces, building, and occupants students will learn how to manipulate this relationship through building form and orientation, construction and materiality, and mechanical, electrical and hydronic systems. The ability and confidence in making both quantitative and qualitative statements about building performance will help students in integrating these considerations into their future design work. It will enable them to develop design solutions that are derived from fundamental principles and do not have to rely on formalistic or empiric solutions. Ultimately students will be able to understand the impact of their design decisions on building performance.

Course Requirements

Attendance: Students are required to attend all lectures and workshops and participate actively in the course discussion. While students might use their laptops to take class notes, students are asked to be respectful of others and not work on other things on their laptops during class. (20% of final grade)

Assignments: Complete and submit all assignments on the respective due dates (30% of final grade). Assignments will be carried out individually. While student interaction and collaborative learning in encouraged students have to carry out all work required to finish an assignments on their own.

Exams: There will be 1 mid-term assessment during the semester and a final written exam (50% of the final grade). The mid-term and exam will be open book/computer; students are expected to bring relevant materials to the classroom for the mid-term and exam.

Grades: All assignments, the mid-term and the final exam will be graded on a point system and the final grade will depend on the total number of points achieved during the semester. Grades will be scored according to the following scale:
>90% High Pass, 60-90% Pass, 50-60% Low Pass, <50% Fail.

Readings
The course has no required text book but the following book are recommended for additional reading:

Norbert Lechner. Heating Cooling Lighting. Design Methods for Architects.
Stein and Reynolds, Mechanical and Electrical Equipment for Buildings.
Daniels, The Technology of Ecological Building

A copy of these books will be put on reserve in the library.
Handouts of important concepts and equations will be made available via courseworks prior to each lecture. These handouts form the basis for the assignments and exams. Further reading material will be recommended where appropriate.

Course Schedule

9/8 Week 1: **Introduction, Course Overview / Building Physics/ Site and Solar**: Definitions, Units, Fundamental Laws, Heat Transfer, Phase and State Change. Climate Zones, Local Climate Influences, Regional Building Responses, Solar Path, Shading Geometry, Sources of Weather and Climate Information.

Assignment 1: Site Analysis, Solar Path Diagrams, Shading.

9/15 Week 2: **Comfort , Psychrometrics and Light**: Definitions, Thermal Comfort Factors, Evaluation of Thermal Comfort, Psychrometric Chart, Properties of Light .

Assignment 2: Evaluating Thermal Comfort Factors.

9/22 Week 3: **Building Fabric Losses**: Material Properties, Conduction, Thermal Storage, Moisture Transfer, Infiltration, Examples.

Assignments 1 and 2 due.

Assignment 3: R-Value Calculations, Steady State Heat Loss, Condensation.

9/29 Week 4: **Building Gains**: Material Properties of Glass, Solar Heat Gain, Glazing Systems, Shading Systems , Internal Gains, Building Heat Balance, Examples. Introduction to Simulation and Advanced Facades.

Assignment 3 due.

10/6 Week 5: **Air Distribution**: Ventilation Losses, Ventilation Requirements, Indoor Air Quality Concerns Natural and Mechanical Ventilation Concepts, Definitions, Systems, Distribution, Equipment Sizing, Design Integration, Examples.

Assignment 4: HVAC scavenger hunt

10/13 Week 6: **Heating and Cooling**: Definitions, Heat Sources, Heating and Cooling Systems, Examples. Introduction to Thermal Simulation.

Assignment 4 due.

Assignment 5: Building Heat Gain Simulation.

10/20 Week 7: **Energy Systems**: Definitions, Energy Conversion, Applications, Equipment, Examples.

Midterm Assessment (exam)

Assignment 5 due.

Assignment 6: Energy Efficiency Evaluation

10/27 Week 8: **Alternative Energy Systems/Benchmarking:** Definitions, Passive and Active Solar Systems, Wind Energy, Ground Coupled Systems, Examples. Life Cycle Analysis, Payback Calculations, Current Initiatives, LEED System/Scorecard

Assignment 6 due.

11/3 NO CLASS

11/10 Week 10: **Lighting Part I**: Definitions, Units, Lighting Criteria, Visual Comfort, Lighting Fixtures, Architectural Lighting Design process

Guest Lecture (Rebecca Mintz, Lighting Designer, Atelier Ten)

11/17 Week 11: **Lighting Part II**: Daylighting, Lighting Integration, Controls, Electrical Building Systems, Examples.

Guest Lecture (Michael Esposito, Environmental Designer, Atelier Ten)

Assignment 7: Lighting Simulation.

11/24 Week 12: **Acoustics**: Definitions, Environmental Noise and Noise Control, Noise of Buildings and Occupants, Room Acoustics, Calculation Techniques.

Guest Lecture (Terence Caulkins, Acoustic Engineer, Arup) Assignment

7 due.

12/1 Week 13: **Vertical Circulation, Fire Protection and Plumbing Systems**

12/8 Week 14: NO CLASS

12/15 Week 15: **FINAL EXAM.**

Columbia University
Graduate School of Architecture, Planning and Preservation

A4113: Envelopes in Architecture

Instructors: Silvia Prandelli, Director, Werner Sobek New York
Erik Verboon, Associate, Buro Happold

Course Description

Recent trends in building design have been with a goal of "performance" and system integration as a form driver. While large formal, orientational, and massing gestures can play a large role in attaining particular functional goals in relation to energy use and comfort, assembly and component based moves at the building envelope level can often play a larger role in the overall performance of a particular building.

This course explores the design of building skins to comply with a set of requirements while turning an architectural concept to a finished system product. Potential material and systems will be explored for different areas of the building that satisfy the architectural and functional constraints along with these performance goals. The lectures will focus on case studies of real projects that have utilized integrated envelope design as well as tools to optimize the envelope shape and the material assemblies. The final aim of the course is to teach students the process of defining an envelope strategy while conceiving complex geometry systems and to give an overview of the different parties involved in the decision making process in the New York, American, and overseas markets.

Breakdown of Modules:

- **Step 1- Performances Introduction:** students will be shown processes involved in the selection of the most appropriate skin solutions in line with the Architectural intent and the required performances via in class presentations and site meetings with industry representatives.
- **Step 2 - Analysis and Construction:** students will work in groups and analyze a set of performances on an actual project or a Studio design in order to finalize a set of possible options. These options will be then evaluated via a construction of a physical mock up for constructability or computer generated tools to optimize a set of performance parameters. Students will finally present their strategy and findings. Final presentation to include developed envelope section drawings of key areas that are representative of their primary system strategies. Concepts that the sections are expected to indicate include but are not limited to the following:
    - Constructability
    - Modularity and material sizing
    - Support strategies
    - Thermal insulation
    - Integrated technologies
    - Ventilation
- **Step 3 – Innovation**: a set of presentations by industry representatives will inform the student design carried out during the second phase of this course. Students will have an option to review their design following the presentations to include for an innovative approach.

Course Outline:

Class No.	Module	Class Topic
1	Step 1 Performances Introduction	Understanding the Design Intent
2		Structural Design
3		Environmental Requirements and Weather Performance
4		Lighting Design
5		Geometry Modeling and Constructability
6		Supply Chain and Budget Costing
7		Acoustics
8		Durability
9	Step 2 Analysis and Construction	Analysis
10		Construction
11		Student presentations
12	Step 3 Innovation	Industry presentations
13		Student presentations

Grading:
Students will receive grades based on the quality of the presentations and additional deliverables assigned at each class. Presentations and class deliverables will carry a 50% weight towards the final grade, while a further 50% will be given for class participation and attendance.

Suggested resources:
The following is a list of optional resources:

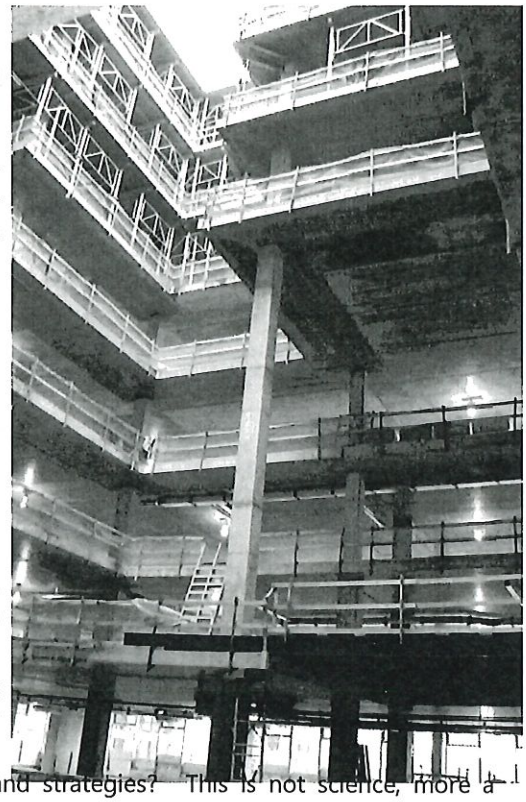
- Detail in Contemporary Glass Architecture Publisher: Laurence King Publishing ($35)
- Facades: Principles of Construction Publisher: Birkhauser ($49)
- In Detail: Building Skins: Concepts, Layers, Materials Publisher: Birkhauser ($99)
- Kinetic Architecture:: Designs for Active Envelopes Publisher: Images Publishing ($80)

COLUMBIA GRADUATE SCHOOL OF ARCHITECTURE PLANNING AND PRESERVATION

COURSE SYLLABUS:

A4114 INTEGRATED DESIGN: BUILDING SCALE
FALL 2015

CLASS DESCRIPTION

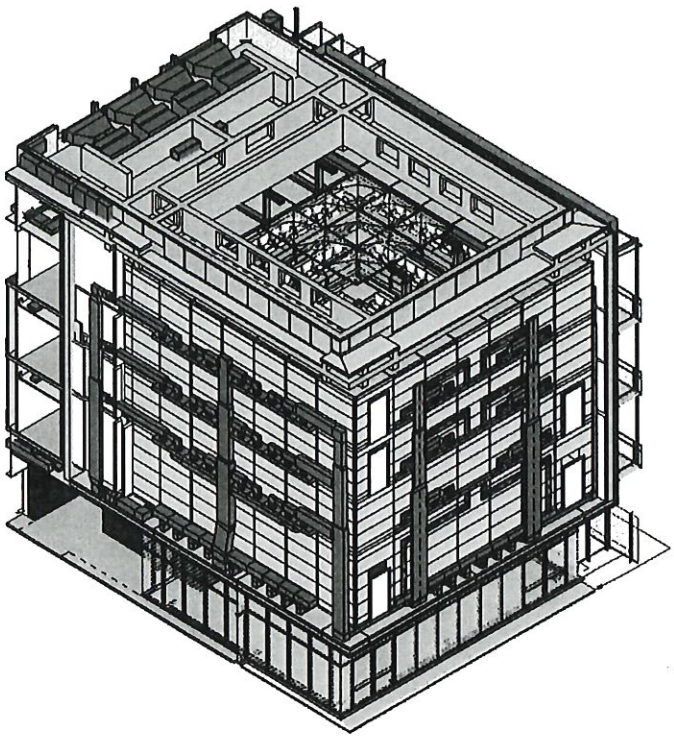


Integration is about problem solving. Architects, engineers and builders work at the building scale alongside of one another making a complex set of decisions for every move in designing buildings. The architect has a key role in ensuring the synthesis of many demands – economy, elegance, efficiency. Through a better understanding of all systems, architects are able to integrate systems more completely. A well-integrated building is an efficient one. A well-integrated building gets built.

This class is a key part of your Columbia experience. It will form the basis of a year long exploration on integration across multiple scales in the built environment. While we will begin with building scale in the fall semester, the spring semester will build on this knowledge as we reach out to urban and city scale design issues.

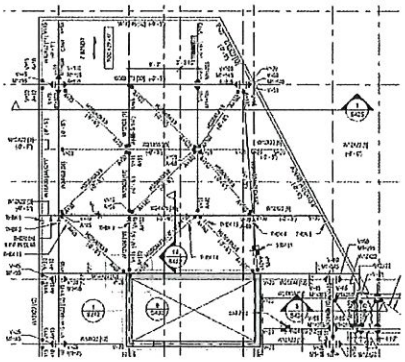
A4114 Integrated Design : Building Scale will revisit the key areas of study that you have already begun at GSAPP in building technology – environmental systems, structural systems and envelope systems. We will take a fresh look at each of these with a practical eye. What are the key issues to understand in planning a building? What techniques lead to rapid iteration around design ideas and strategies? This is not science, more a developed and applied understanding of how the pieces of constructed form get put together.

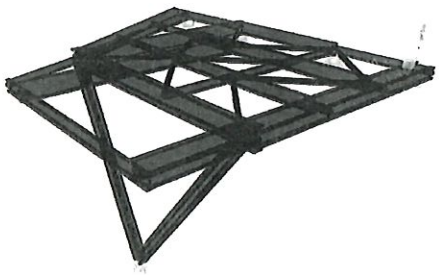
The course will start with key ideas around integration at the building scale. What drives the first decisions to be made on a project? Where do the first technical constraints appear in massing, egress, structure, mechanical systems? We will explore through early lectures and assignments some fundamental ways of looking at the basic drivers for decision making and use of tools and support information to assist you in developing your future projects, including the project for this class.



Façade systems will be explored simultaneously in ***A4113 Envelopes in Architecture*** and work in this class will support the project work we will be doing in ***A4114 Integrated Design – Building Scale***. This course will also aim to pick up elements of your studies in housing studio. Assignments for the first half of the semester will build on your current work in Core III.

Beginning in the 4th week of the semester,
teams will be formed and the remainder of the semester dedicated to developing a detailed building design and a corresponding series of drawings for integrated systems. These drawings will be developed through weekly reviews with a critic team consisting of an architect, a structural engineer, and an environmental engineer. The end product of these will be a final set of design drawings for the class as the final project.





The class will expose students to current construction practices through a series of visits to construction sites in NYC. These visits are important to understanding real scale of building elements and a practical appreciation of the trades of construction. Visits to these sites will be outside of dedicated class time. Visual reports of site visits and documentation of the construction technologies will be required.

CLASS SCHEDULE AND LECTURE OUTLINE

9/8 WEEK 1 LECTURE Introduction to Integration

TOPICS:
- *Integration, what is it good for?* Considerations on integration in building design. Historical context and current approach to integration in the digital era.
- *Help, I need to get Out!* Understanding Egress and Design
- *Case Study Focus:* US Institute of Peace. Arch: Moshe Safdie

READING: Precedents in Integration.
ASSIGNMENT: #1. Egress analysis.

9/15 WEEK 2 LECTURE Standing

TOPICS:
- *Filling in the gaps.* Developing Wall Types and other such strategies for understanding performance and space in concept development.
- *Looking at options in structure.* Practical guidelines to planning in steel and concrete construction. Review of framing systems, lateral systems and foundation systems.
- *Case Study Focus:* Isabella Stewart Gardner Museum. Arch: Renzo Piano Building Workshop

READING: Case Studies
ASSIGNMENT: #2. Preliminary Structural Concept Development.

9/22 WEEK 3 Breathing

TOPICS:
- *Looking at options in structure.* Long span systems, edge conditions, coordination with envelope systems.
- *Too Hot or Too Cold?* Common methods and space planning for mechanical systems.
- *Water Systems in Architecture.* Basics of planning issues associated with plumbing systems
- *Case Study Focus:* St Ann's Warehouse Arts Center. Arch: Marvel Architects (GUEST LECTURE: Niall Cooper, Principal Buro Happold. John Owens, Principal Charcoal Blue)

READING: Case Studies
ASSIGNMENT: #3. Preliminary Concept Development for PLAY

9/24 SITE VISIT #1: Alice Tully Hall. Arch: Diller, Scofidio, Renfro.

9/29 WEEK 4 Project Concept Discussion With Critic Team

TOPICS: SD Crit #1

10/1 SITE VISIT #2: Manhattanville Campus. Arch: Renzo Piano Building Workshop

10/6 **WEEK 5 TRAVEL WEEK FOR HOUSING STUDIO – NO CLASS**

10/13 **WEEK 6 Scheme Design**

TOPICS: SD Crit #2

10/20 **WEEK 7 Scheme Design**

TOPICS: SD Pinup and Progress Review

10/22 **SITE VISIT #3:** JDS East Side Development. Arch: SHOP

10/27 **WEEK 8 Design Development**

TOPICS: DD Crit #1

11/3 **WEEK 9 NO CLASS**

11/10 **WEEK 10 Design Development**

TOPICS: DD Crit #2

11/17 **WEEK 11 Design Development**

TOPICS: DD Pinup and Progress Review

11/24 **WEEK 12 Construction Documentation**

TOPICS: CD Crit #1

12/1 **WEEK 13 Construction Documentation**

TOPICS: CD Crit #2

12/8 **WEEK 14 FINAL REVIEWS – NO CLASS**

12/15 **WEEK 15 Construction Documentation Final Review**

TOPICS: CD Pinup and Final Review

COLUMBIA GRADUATE SCHOOL OF ARCHITECTURE PLANNING AND PRESERVATION

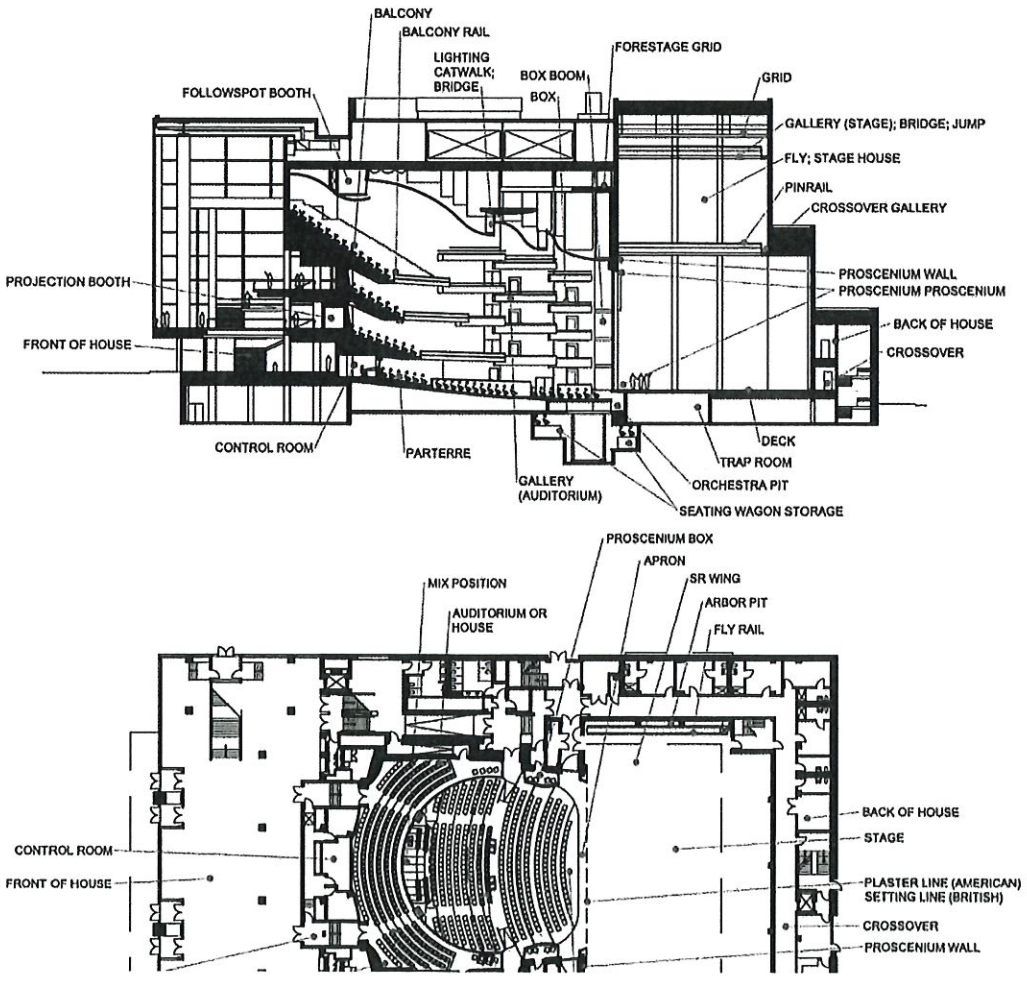
A4114 INTEGRATED DESIGN: BUILDING SCALE

Design Project - Play

A. Program

The program for PLAY is a warehouse theatre for dramatic presentations and concerts. The theatre is a flexible space that can also accommodate film shoots, community meetings, design expositions and gala dinners. For theatre events, the "house" or audience chamber accommodates 600 seated patrons parterre. The seating is removed for rock and indie music concerts and the same room can be filled with 1,200 occupants. The only fixed programmatic elements in the house are the control room and the stage house. In terms of finishes, the warehouse is a black box space. The stage is p format.

The front of house (FOH) is the public area of the theater and includes the entrance doors, lobby and restrooms. Between the FOH to the house is a sound and light lock. This vestibule separates the auditorium from the lobby to block noise and light from entering the house. Backstage or back of house (BOH) is the area of the theatre not open to the public.



B. Site and Massing

The site is 128 Van Brunt Street Brooklyn. The property is a single tax lot Block 502, Lot 25. The lot is currently for sale for $21.5million. The lot is bordered by buildings on 2 sides, with an exposed façade on the front and rear street face. Based on zoning, the maximum building height is 50ft. For the project to be financially feasible, the Owner requires build out of the entire 60ft height over the site. Any left-over square footage will be recording studios.

C. Egress & Circulation

Develop egress passages for the building that are compliant with the 2014 NYC Building Code. In the case of fire, how will occupants exit the building from the FOH and BOH house areas? Will they share the same exits or should egress zones be created? How many "exits" are required in each zone? Calculate the occupant load and design code compliant egress passages that include: exit access; exit passage; exit discharge; # of doors; and door widths. See the Appendix for Chapter 10 of the NYC Building Code. This can be used to calculate and design all of the egress elements.

Determine the number of elevators required.

D. Fire Protection

Passive fire protection is compartmentalization of the building using fire-rated walls and zones. Define compartmentalization in the building for fire. Which walls are rated? How is the spread of fire contained? Is the lobby an atrium? Define the sprinklers

E. Structure

In a successfully integrated design, structural systems are seamlessly woven into the spatial layout and architectural form. That is the goal for this project. Columns should be located at breaks in the program. Should columns obstruct sightlines within the theatre? No, so how do you support the catwalks and roof without columns? Consider the location of all structural elements in terms of the program.

Both a lateral and gravity load resisting system are required. Clearly conceptualize and diagram both systems for the structure. For the gravity system, consider how each floor is supported. The BOH is a standard skeleton but the house area should be a long span truss. Consider the use of party-walls and stair core walls for the lateral system.

Essentially, structure is the construction sequence so develop the way the building will be constructed: foundations installed; columns erected; beams dropped in place and slabs poured.

The soils bearing capacity is 6kips per square feet. There is no cellar in the structure.

F. MEP

Define the heating and cooling systems for the building. Size and locate mechanical rooms. Develop plumbing layout.

G. Enclosures

Enclosures will be developed as part of the enclosures class.

H. Deliverables

Creating a building is an adventure. For this project we're encouraging an iterative-based approach that mimics the development of a real project. Trial and error is encouraged, failure is celebrated, and the potential for success is realized. Your team's design process is coupled with reviews and mentoring with professional experts who will work side by side with your team to develop the project.

For the deliverables, the focus should be on design integrity rather than create graphic images. Deliverables should be in 2D line drawing format. 3D Revit or rhino models can be develop concepts,

express studies of typical bays, construction sequences or solar shading. However, realistic renderings are not recommended for developing the systems design. The following drawling list is the minimum drawing requirements to be presented at each phase. Additional drawings and renderings can be supplemented at your team's discretion. At each review, drawings must be presented on 24x36 sheets and uploaded to drop box in PDF format.

i. Schematic Design Review 10/20
Generating concepts, sketching, modelling, wireframes and storyboards of all the systems
- Architectural Ground Floor Plan 1/8" = 1'-0"
- Architectural Upper Floor Plans 1/8" = 1'-0"
- Architectural Section 1/8" = 1'-0"
- Egress calculations
- Structural Concept Diagram
- Mechanical Concept Diagram
- Sustainability Strategy

ii. Design Development Review 10/20
- Architectural Ground Floor Plan 1/4" = 1'-0"
- Architectural Section 1/4" = 1-0"
- Structural Plans 1/8" = 1'-0"
- Mechanical Diagrams

iii. Construction Documents Review 10/20
- Architectural Plans 1/4" = 1'-0"
- Architectural Section 1/4" = 1-0"
- Egress Plans and Sections 3/8" = 1' -
- Structural Plans 1/8" = 1'-0" 0
- Structural Section 1/8" = 1' "
- Construction Sequence 3D Axonometric
- HVAC Diagram -
- Electrical/Plumbing 0
  Fire Protection Diagrams "
- Key Integration Detail 3D Axonometric
- Project Outline Specifications
- Project Outline Budget

I. Starting Point

All drawings should follow the American Institute of Architects (AIA) layer standards. Following the AIA line weight and line style standards ensures depth and hierarchy. The following blocks and base drawings are provided to give a head start:
- *Standard Drawing with AIA layers and annotative formatted text*
- *Titleblock*
- *CTB or STB*
- *Example projects*
- *CAD block of cores*
- *CAD block of seating*
- *CAD block of stage*