

UNIVERSITY of NOTRE DAME  
School of Architecture

**DESIGN VI/ ARCH 41121 (& AME 47431)**

BUCCELLATO STUDIO SPRING 2015  
Environmental Stewardship through Interdisciplinary Research and Design

**Course Syllabus**

**Instructors:** Aimee P. C. Buccellato  
Office: 314 Bond Hall  
Practice: 574-288-7723/ Cell: 201-344-4112/ Campus: 574-631-1431  
Email: [abuccellato@nd.edu](mailto:abuccellato@nd.edu), [aimee@buccellatodesign.com](mailto:aimee@buccellatodesign.com)  
Office Hours: by appointment

David B. Go (AME 47431)  
Office: 370 Fitzpatrick Hall of Engineering  
Campus: 574-631-8394  
Email: [dgo@nd.edu](mailto:dgo@nd.edu)

**Meetings:** ARCH 41121: Monday, Wednesday & Friday; 1:15 – 5:00 pm  
(AME 47431: Monday, Wednesday & Friday; 2:00 – 2:50 pm and reviews)

**Course Status:** Required for B. Arch Degree

**Course Credit:** 6 hours

**Course Content:**

This semester, you will undertake a series of three related analysis and design projects, culminating in a comprehensive and multi-scale design exercise involving the execution of a new neighborhood Master Plan and model housing for graduate and married students at the University of Notre Dame. This exercise, while academic in nature, is aimed at supporting the on-going work of the University's Office of Residence Life, the Graduate Housing Task Force, and the University Architect's Office, as they consider Notre Dame's growing graduate population alongside our institutional mission to provide exceptional student-resident life experience at Notre Dame.

Your investigation of the design problem will include the study of traditional principles of urbanism and detailed building design solutions focused on the integration of the following considerations: impact and influence of context (history, culture, climate, localized traditions, existing conditions), *with particular emphasis on* the relationship between construction materials and methods and the integration of site, structural and environmental systems, accessibility and regulatory requirements, and sustainable and passive energy design approaches.

Project 1a:	Context, Climate & Architectural Form	(1 week)
Project 1b:	Critical Circumstances	(2 weeks)
Project 2 (3 parts):	Community: Traditions, Culture, and Place	(~13 weeks)
	Project 2a: Site & Precedent Analysis	
	Project 2b: Master Plan & Comprehensive Building Design	
	Project 2c: Final Report	

## Environmental Stewardship through Interdisciplinary Research and Design

Recognizing the significant growth of our graduate programs over the last decade and associated demand for housing for the growing graduate population, including, specifically, married students and married students with families, coupled with the challenges of an aging building stock (current University Village complex, Cripe Street Apartments, and Fisher and O’Hara-Grace Residences) and increased expectations on the part of students and families living in University settings, your design investigation this semester will propose the next generation of graduate housing at the University of Notre Dame.

Your challenge is two-fold: your design of a new neighborhood and graduate housing complex must promote and serve the current and projected graduate population – and the values of the University as a leader in student-life quality – and meanwhile serve as a model of truly exemplary multi-family residential design, whether located on this campus, other campuses, or other urban settings. An idea in support of this: we recognize the loss of regional culture associated with globalization and primarily market-driven manifestations of “sustainable” architecture; there is an opportunity in this project to capture and preserve local heritage while generating broader ideas about community, sustainability, and transient housing that are transferrable to other settings.

In order to meet the University’s ambitious goals for sustainable campus infrastructure while simultaneously minimizing the overall impact of the proposed development on the natural environment, your design of the new graduate student housing complex is expected to integrate and promote durable and sustainable principles of architecture and urbanism at every opportunity. From the guiding Master Plan (Twyckenham corridor of the Morningside Neighborhood) and your treatment of the immediate site (including landscaping), to the design of the buildings and the materials and methods employed in their construction and operation, the buildings that you propose must endeavor *to preserve* and carry forward the local, normative traditions and culture of the *current* University Village complex, *and* meanwhile become enduring and didactic examples of thoughtful and environmentally sensible – and sustainable – multi-family residential design for our community.

In order to translate the values of the existing graduate community that your design proposals will serve, you must achieve a thorough understanding of the “existing conditions” of the University Village community, conditions both physical and cultural. This understanding of your “client” and their current context, values, and traditions will be achieved through your observations of the existing University Village complex off of Douglas Road and thorough analysis of a 2014 University Village Resident Survey conducted by your peers in this studio last spring. The resulting “data” collected, along with your analysis of the specific, normative conditions of this particular community, will necessarily need to be synthesized, prioritized, and applied *by you* in your design of a new neighborhood Master Plan and residential buildings to serve this community on a new site along the east side of campus.

The critical project values that you identify through your study of the site and your clients’ needs – or the “Basis of Design” – will be further enhanced by your practical collaboration with senior mechanical engineering students who will be embedded in the studio, working alongside you to generate and interpret performance analyses of your designs *throughout – and in service to – the design process*. Through this collaboration, you will work together to achieve buildings that are designed to “perform” on many levels (physical and cultural), and explicitly as structures intended to optimize passive methods of energy and environmental control.

Building upon your understanding of fundamental principles of durable design and construction, your comprehensive design investigation this semester will involve an iterative collaborative approach with your mechanical engineering colleagues, who will use prevailing building modeling and energy performance analysis software and tools to provide rapid feedback on the anticipated performance of your building designs. Your design presentations this semester (interim and comprehensive) are expected to include explicit, iteration-specific feedback and analysis from your mechanical engineering cohorts presented alongside the resulting design influence(s) that resulted from your collaboration.

This collaboration is meant to enhance both the architects' and the mechanical engineers' preparation to enter into their respective professional practices, where such collaboration is expected, particularly in light of increasing demands for integrated project delivery in design and construction, and associated initiatives by the National Council for Architectural Registration Boards (NCARB; organization that governs licensure), the National Architectural Accreditation Board (NAAB), and the American Institute of Architects (AIA) to foster and encourage cross-disciplinary engagement during the education of the architect.

### **Client Engagement and Review:**

This semester, you will have several opportunities to interact with your clients, residents of University Village, and key Faculty and University Officers on the Graduate Housing Task Force. These meetings are intended to provide you with various opportunities to cultivate an understanding of both your clients' needs and desires and the practical demands that the administration is simultaneously considering related increasing housing needs for graduate students on our campus. Throughout the semester, project meetings and your juried presentations may be attended by representatives from the Task Force, residents of University Village, the University Offices of Budget and Finance, Residence Life, Architecture, and Facilities & Operations. Their participation will give you the opportunity to receive feedback while giving you the opportunity to share and communicate your understanding of the critical issues surrounding housing for this particular segment of our graduate population. In addition to the Final Report that you will generate as a studio (ARCHs and MEs) at the end of the semester, your individual design presentations may be selected to represent the work of our studio this semester in various public and private meetings related to the on-going efforts of the Task Force.

NB: In order to share the outcome of our collaborative efforts with your colleagues in the College of Engineering this semester, you are *encouraged* (although not required) to collaborate as a studio to contribute a presentation and exhibition of work for the 8<sup>th</sup> Annual Undergraduate Scholars Conference (Friday, May 1, 2015) held by the Center for Undergraduate Scholarly Engagement at the University of Notre Dame. **The date to submit an abstract for Conference consideration is typically the third Friday in March.** Conference Information and Guidelines will be available in late January, at <http://undergradresearch.nd.edu>.

## Fundamental Learning Objectives:

As architecture is a discipline across scales, the fundamental principles of composition must be considered at every level – at the scale of land-use and urban planning, to the composition and organization of a building, to the character of a building, its tectonics and detail. Your comprehensive solution for the proposed graduate residence complex will involve investigation across all scales, and through a series of exercises and analyses **the following fundamental learning objectives will be met:**

1. Further develop your understanding of what is to be gained by studying the roots of traditional building systems and the adaptation of those systems to suit the contingencies of place; ie: a region, its climate, local resources, economics, and necessity.
2. Enhance ability to think critically about construction materials and methods and the integration of long-standing traditions and emerging technologies.
3. Establish methodology or methodologies for identifying the normative conditions of a place, whether urban or rural, its building types, architectural character and details, and localized permutations, and the cultural influences and traditions fostered.
4. Develop a clear methodology for how one approaches the design of an urban intervention and/ or new building in *any* context and at *any* scale.
5. Enhance your foundational knowledge of western classicism and how that knowledge can contribute (*vis-a-vis* rigor and application) to your understanding of long-evolved, and in this case, vernacular, architectural traditions.
6. Enhanced presentation modes, methods, and collaboration skills through team-based design projects and practiced-based collaboration with mechanical engineering students.

## Grading<sup>1</sup>:

Comportment/ Studio Performance:	20% *
Project 1a:	15% **
Project 1b:	15% **
Project 2a:	10% **
Project 2b:	25% ** (5%: tech' memos & interim pin-ups 5% mid-review)
Project 2c:	15% **
<hr/> <b>TOTAL:</b>	<hr/> <b>100%</b>

\* Attendance in studio is mandatory for the full class period (1:15-5:00 pm), unless special permission is granted by your instructor. This grade incorporates **evaluation of design process**, including preliminary site and building design investigations and analyses, interim presentation, and studio participation.

\*\* Project presentations and final submissions must include images and analysis of all precedent sources and references for the project(s) in addition to a written bibliography of sources used. **Projects presented/ submitted without this information will be considered incomplete and will not receive a passing grade (see also requirements described in the individual Project Briefs).**

---

<sup>1</sup> For the Grading Scale, refer to The University of Notre Dame Undergraduate Studies *Bulletin of Information*

**General Disclosure:**

The Instructors retain the right to modify the contents/requirements/deliverables for this course throughout the semester. The students retain the right for adequate notice of any changes via email or in-class announcements.

**Class and Studio Conduct:**

1. **Attendance is required in studio and on all field trips.** Students are expected to attend class regularly and *punctually*. Three unexcused absences will result in a lowered grade for the course; 1 grade point per 3 absences. Absences due to illness or personal and family emergencies will be evaluated *by the instructor* on an individual basis<sup>2</sup>.
2. Full participation in class is integral to learning (and will be counted as part of your grade for this course).
3. Project requirements are due on the dates stipulated in the course calendar and project briefs. **Late work will not be accepted.**
4. In order to promote a constructive learning environment, use of **ANY** of the following electronic devices is not permitted during class (lecture, studio, field trips): cell phones, PDA's, visual or audio storage or playing devices.
5. Entering Notre Dame you were required to study the on-line edition of the *Academic Code of Honor*, to pass a quiz on it, and to sign a pledge to abide by it. The full *Code* and a *Student Guide to the Academic code of Honor* are available at: <http://www.nd.edu/~hnr/code/docs/handbook.htm>. Perhaps the most fundamental sentence is the beginning of section IV-B: The pledge to uphold the *Academic Code of Honor* includes an understanding that a student's submitted work, graded or ungraded – examinations, draft copies, papers, homework assignments, extra credit work, etc. - must be his or her own.
6. In order to limit disruption and distraction in class (not fair to your peers or your instructor) please refrain from eating in class. If you must eat in class, please do so with the utmost respect for your classmates, University property, your instructor, and guests.
7. All students entering the School of Architecture were invited to sign a form giving the School permission to hold their work for exhibition and to publish it. If you signed that form, work done in this course may be retained. It will of course be available to the author for scanning/photographing and will be returned. Because work held for exhibition may be held beyond graduation, be sure that it is labeled on the back with your name and an address to which it can be returned.  
  
**\*\* Please retain and scan at high resolution *all* presentation drawings and important process drawings at the completion of each project; these will be due to the course Box.ND site prior to each – and every – project deadline.**
8. The custodial staff is always careful to avoid disturbing material on desks and layout tables; however, anything that is left on the floor of the studio is subject to being thrown away during routine nightly clean-up. Further, you are asked to keep the floors as clear as possible around your desk and layout table so that regular daily cleaning by the custodial staff is not unnecessarily encumbered.

---

<sup>2</sup> Refer to page A-9, sections 13.1 and 13.2 in *du Lac* for the University's policy on absences.

9. Please check your Notre Dame e-mail account regularly. Any communication from the instructor about this course outside of regular class hours will be directed to your University account. *You are responsible for knowing all course communication in a timely manner.*

### **Required Texts:**

- Edward Allen and Joseph Iano, *The Architect's Studio Companion: Rules of Thumb for Preliminary Design*, 5th Ed., Wiley.
- Francis Ching, *Building Construction Illustrated*, 5th Ed.

### **Highly Recommended Reading:**

*Architectural Record*. "An Interview with Glenn Murcutt". May 2009: 105-110. Print.

Steven Peterson, *Urban Design Tactics*

Steven Peterson, *Space and Anti-Space*

Matthais Sauerbruch. "Sustainability or the Redefinition of the Pleasure Principle". *Harvard Design Magazine* 30. Spring/ Summer 2009: 60-67. Print.

### **General Reference Texts** (1 Copy of each on Reserve in Bond Hall Library):

- Edward Allen & James Iano, *Fundamentals of Building Construction, Materials & Methods*, 5th Ed.
- Edward Allen & Patrick Rand, *Architectural Detailing*, 2nd Ed.
- James Ambrose, *Construction Revisited: An Illustrated Guide of Construction Details from the Early 20th Century*
- James Ambrose, *Simplified Engineering for Architects and Builder*
- Bjorn Berge, *Ecology of Building Materials*
- G. Z. Brown, *Sun, Wind and Light: Architectural Design Strategies*
- Francis Ching, *Architecture: Form, Space, and Order*, 2<sup>nd</sup> Ed. or later
- Ching and Winkel, *Building Codes Illustrated: A Guide to Understanding the 2006 International Building Code*, 2<sup>nd</sup> Ed.
- Norman Crowe, *Nature and the Idea of the Man-Made World* and *Visual Notes for Architects and Designers*
- Philip G. Knobloch, AIA, *Good Practice in Construction*
- Fuller Moore, *Understanding Structures*
- Harry Parker, *Simplified Design of Roof Trusses for Architects and Builders*
- Harry Parker, *Simplified Design of Wood Structures*
- Harry Parker, *Simplified Design of Structural Steel*
- Ramsay, Sleeper, *Architectural Graphic Standards/ Student Edition*
- Trust and Choudhury, *Design of Mechanical and Electrical Systems in Buildings*

- *International Building Code, 2009 edition* – or later
- ICC/ AMSI A117.1-03 “*Accessible & Usable Buildings and Facilities*” (available on-line)
- Szabo and Barfield, *Afghanistan: An Atlas of Indigenous Domestic Architecture*
- Inaba and Nakayama, *Japanese Homes and Lifestyles: An Illustrated Journey*
- Clark and Pause, *Precedents in Architecture, 3<sup>rd</sup> Ed.*
- Yoshida, *The Japanese House and Garden*
- Givoni, *Man, Climate, and Architecture, 2<sup>nd</sup> Ed.*
- Engel, *The Japanese House*
- Fitch, J.M., *The American Building, 2: The Environmental Forces that Shape It*
- Markovich, Preiser, and Strum, *Pueblo Style and Regional Architecture*
- Sanford, *The Architecture of the Southwest*
- Newcomb, *Spanish-Colonial Architecture in the United States*
- Oliver, *Dwellings*
- May, *Buildings Without Architects*
- Smith, *Prefab Architecture*
- Baird, *The Architectural Expression of Environmental Control Systems*
- Sloane, *An Age of Barns*

## NAAB CRITERIA – ARCH 41121/ Design VI\*

The Bachelor of Architecture programs at Notre Dame is accredited by the National Architectural Accrediting Board (NAAB) as “professional degree,” one that satisfies the academic requirements for practice. That accreditation is given on the basis of extensive review of the program. Design VI is required to satisfy the following items from a list of twenty-six criteria for student performance:

- A.2. **Design Thinking Skills: Ability**
- A.3. Investigative Skills: ability
- A.4. **Architectural Design Skills: Ability**
- A.6. Use of Precedents: ability
- A.7. **History and Global Culture: Understanding**
- A.8. **Cultural Diversity and Social Equity: Understanding**
  
- B.2. Site Design: ability
- B.3. Codes and Regulations: ability
- B.4. Technical Documentation: ability
- B.5. Structural Systems: ability
- B.6. Environmental Systems: ability
- B.7. Building Envelope Systems & Assemblies: understanding
- B.9. Building Service Systems: understanding
  
- C.1. Research: understanding
- C.3. Integrative Design: understanding

\* Updated per revised guidelines issued on 12/17/2014 (JS)

**UNIVERSITY OF NOTRE DAME**  
**Department of Aerospace and Mechanical Engineering**  
**AME 47431: Designing Energy-Efficient Buildings**  
4<sup>th</sup> Year Design Studio Space, Bond Hall  
Monday, Wednesday, Friday, 2:00 p.m. – 2:50 p.m.

**Instructor:**

Prof. David B. Go  
Department of Aerospace and Mechanical Engineering  
370 Fitzpatrick Hall  
Phone: 574-631-8394  
Email: [dgo@nd.edu](mailto:dgo@nd.edu)  
Website: <http://www.nd.edu/~dgo/>

**Co-Instructor:**

Prof. Aimee P.C. Buccellato  
School of Architecture  
314 Bond Hall  
Phone: 574-631-1431  
Email: [abuccellato@nd.edu](mailto:abuccellato@nd.edu)

**Office Hours:** By appointment.

**Email Contact:**

Dr. Go will respond to any email sent during the week within 24 hours. Dr. Go cannot guarantee email availability on weekends, but will respond as soon as possible.

**Course Website:** We will use the Box utility to share documents, submit assignments, and communicate course requirements.

**Course Text:** There is no formal course text, but students are encouraged to download manuals for SketchUp and Sefaira as well as those for the Department of Energy's EnergyPlus, which is the backbone for the Sefaira software.

- <http://help.sketchup.com/en/article/36213>
- <http://support.sefaira.com/>
- [http://apps1.eere.energy.gov/buildings/energyplus/energyplus\\_documentation.cfm](http://apps1.eere.energy.gov/buildings/energyplus/energyplus_documentation.cfm)

**Final Exam:** None

**Course Content:**

This project-oriented course introduces students to engineering practice by creating an interdisciplinary, collaborative environment with students from the School of Architecture. The intent is to expose the students to collaborative design and analysis by completing design projects in teams that utilize the architectural design skills of the architecture students and thermal analysis skills of the engineering students. Engineering students will be exposed to building thermal and energy analysis software, building computer-aided design software, and architectural concepts and topics.

**Learning Goals:** At the conclusion of the course, the student should be able to:

1. Analyze the thermal performance of a model building and understand the role that climate, design, and circumstances play in a building's design.
2. Construct a 3D computer model of a dwelling or building using the SketchUp software.
3. Analyze the thermal performance of the computer model using Sefaira software.
4. Make design choices informed by analysis to enhance a building's energy performance and recommend energy-efficient design changes for a building design concept.



**Grade and Assignments:** Final grades will be based primarily on project technical memos, project reviews and presentations, and overall engagement in the course and its objectives. Exact values of relative course assignments have not been determined and will be communicated throughout the semester. However, based on the multiple projects and task throughout the semester, the Instructors anticipate the following breakdown:

Task/Project	Deliverable	Percentage of Grade
Project 1a	Pin-Up Review/Technical Memo	10%
Project 1b	Pin-Up Review/Technical Memo	10%
Project 2a MEC Analysis	Presentation	10%
Project 2b Comprehensive Building and Site Design & Analysis	Mid Pin-Up Review Iteration Technical Memos Final Pin-Up Review	10% 10% 10%
Project 2c Final Report	Technical Report	20%
Overall Engagement		20%

**Studio Component:**

Unlike most engineering courses, this course does not have a major lecture component. Instead the majority of the course will take place during the typical studio time for the sister course ARCH 41121. During these studio times, the students will be given time to work on specific projects (see projects outlined below), work with their Architecture student collaborators, give presentations, and receive feedback from the Instructors. However, because of the nature of the two different courses, the meeting times do not overlap completely:

ARCH 41121 Monday, Wednesday, Friday, 1:00 p.m. – 5:00 p.m.  
 AME 47431 Monday, Wednesday, Friday, 2:00 p.m. – 2:50 p.m.

*Attendance during the course meeting time is mandatory for every class; failure to attend class without proper notification will adversely affect the engagement portion of the course grade. In many instances, the students will find that being at the studio and working with their Architecture peers outside the specified course time is very beneficial, and the Instructors encourage the students to use the studio time to be as productive as possible (both during and outside of class time).*

On a few instances, the Instructors will be required to extend the class time to accommodate the activities of the day – in particular a trip to Chicago and major reviews that last the duration from 1:00 – 5:00 p.m. The Instructors will provide notification of these dates well in advance and will help facilitate overcoming any conflicts with other classes with reasonable scheduling. The Instructors do not anticipate this being a major issue, but if it is, please bring it their attention as soon as possible.

Note that any absence must be accompanied by an **approved absence from the Office of Residence Life**. Students should note that there are only seven approved absences under the policies outlined in *du Lac* (Section 3.1): 1) participation in a University-authorized activity, 2) death or major illness in the family, 3) participation in off-campus legal proceedings or administrative procedures, 4) religious holy day, 5) illness, 6) required military duties, and 7) *post-graduate interviews with at least one week notification in advance*.

**General Course Philosophy:**

As a project-based course, there is a significant amount of “self-learning” that is expected of the students, as they will encounter (and tackle) challenges that neither the Instructors or their peers have encountered before. Liberal use of all available resources is encouraged, including the internet, message boards, print resources, and discussion among classmates. However, while collaboration and interaction is encouraged, submitted and graded projects must ultimately be the work of the individual student or pre-identified student teams.

Along those lines, the Instructors are not experienced nor experts with the two primary software packages that will be used for this course (SketchUp and Sefaira). The students will be expected to teach themselves these software tools in order to address the problems defined by the Instructors. Some guidance will be given in the form of tutorials, but the students are encouraged (and expected) to seek other resources and tutorials on their own to improve and enhance their skill with these software packages.

**Honesty:**

All students are expected to follow the Academic Honor Code of the University, which states “**As a member of the Notre Dame community, I will not participate in or tolerate academic dishonesty.**” Copying (in part or whole) another's design, computer program or written work, and cheating on projects or presentations are considered dishonest and absolutely will not be tolerated. It is dishonest to use the work of another student/team even with his or her consent if you are being graded on an individual/team basis. **ALL aspects of every report/memo (text, figures, tables) MUST be the original work of the authors.** If you have questions about the University’s honesty policy – do not assume, ask!

**Disclosure:**

*The Instructors retain the right to modify the contents/requirements/deliverables for this course throughout the semester. The students retain the right for adequate notice of any changes via email or in-class announcements.*

## Course Overview

In this course, engineering students will use a combination of computer-aided design (CAD) software, thermal analysis software, and hand calculations to conduct energy analysis on buildings designed by their architecture collaborators. In addition to these analyses, students will also investigate different energy systems for buildings and learn about energy efficient building design requirements and policy. The course is broken up into a series of tasks and projects as outlined below, with more detail provided throughout the semester:

1. Project 1a: Analysis – Climate & Context-based Design (**Deliverable:** Pin-Up Review & Technical Memo)
  - The objective of this assignment is for the student to conduct a thermal analysis of a building archetype that was designed to promote thermal comfort without the aid of a heating, ventilation or air conditioning (HVAC) system. This analysis will be conducted using hand calculations to predict the temperature of dwelling under different conditions. The results will be presented via a joint pin-up presentation with the ARCH collaborator and a subsequent technical memo containing the details of the analysis.
2. Project 1b: Critical Circumstances (**Deliverable:** Pin-Up Review & Technical Memo)
  - The objective of this assignment is to introduce the students to rapid thermal comfort modeling using SketchUp and Sefaira to analyze the performance of a dwelling designed with minimal resources. The thermal analysis results will be presented via a joint pin-up presentation with the ARCH collaborator and a subsequent technical memo containing the details of the analysis.
3. Project 2a: Community: Traditions, Culture, & Place – Model Energy Codes and Energy Efficient Design Policy (**Deliverable:** Presentation)
  - The objective of this assignment is to research basic aspects of energy efficient building design from a standards and policy perspective. The point is to understand what are the expectations for comfort and energy use from organizations such as the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) and how this influences building design. Ultimately, the students will set a design target for class for the building envelope performance of their final designs. An overview of these codes and the design target will be discussed via a class presentation.
4. Project 2b: Community: Traditions, Culture, & Place – Neighborhood Master Plan & Building Design (**Deliverable:** Pin-Up Reviews (mid & final), Technical and Design Memo (2))
  - The objective of this assignment is to work jointly with an ARCH collaborator to design a master plan for a community of buildings and specific building design, using SketchUp and Sefaira for the energy analysis. The collaborative pairs work closely to conduct iterative studies in order to understand factors impact site and building performance and to make design decisions that balance form and function with energy performance. The results will be presented at both mid and final pin-up reviews and through short technical memos detailing the iterative process.
5. Project 2c: Community: Traditions, Culture, & Place – Neighborhood Master Plan & Building Design (**Deliverable:** Presentation and Technical Memo)

- The objective of this assignment is for the ME and ARCH collaborative teams to produce a final report outlining their design and design choices, including iterations during the process, and final site and building energy performance.

- 

### **Deliverables**

There are multiple types of deliverables for this class depending on the class or project.

#### *Technical Memos*

Technical memos will follow the format used in AME20213 Measurements and Data Analysis. They will be double spaced and limited to 5 pages (excluding references and appendices). They will be delivered as both hard and soft (electronic) copies.

#### *Presentations*

Presentations using Powerpoint or a similar software program will be given during class. Because of the number of students, class may be extended on these days and the option of shortening studio time on other days will be offered. Guidelines on the number of slides and presentation length will be given for each assignment. In addition to giving the presentation, copies of the slides must also be delivered as both hard and soft (electronic) copies.

#### *Pin-Up Reviews*

The engineering students are expected to partake in the multiple pin-up review with their ARCH collaborators, including the final review given to a jury of experts and clients with vested interest in the project. They will provide tables/charts/diagrams as necessary and partake in the review process, both explaining aspects of their analysis and how it impacted design as well as answering questions.