**Georgia Institute of Technology | College of Design | School of Architecture**

**ARCH 6050 D+R Studio**

Studio MF 1:10-6:10pm W 1:10-3:10pm

**Prof: Gamble with Gentry and Augenbroe**

**Spring Semester 2017**

**HOUSEWORK CONTINUED**

**ZERO ENERGY HOUSING: LIVING | DWELLING AROUND DEKALB AVENUE CORRIDOR**

**Keywords:** Living Buildings, Urban Site/Public Space, Housing Types/Programming, Renewable Energy*,* Sharing Economy

This advanced design studio will build on the momentum of a successful interdisciplinary graduate and undergraduate level coursework offered to engineers and architects now in its fourth year of delivery: Net Zero Energy Housing.

[www.zedhstudio.com](http://www.zedhstudio.com)

**Course Description**

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We will develop two design problems this semester:

**Hulsey/Pullman Railyard Infrastructure Intervention**

**Hulsey/Pullman Railyard Living Housing Prototypes**

**Problem 1 is Local**

While the Beltline serves to join numerous diverse neighborhoods, the Eastside Trail extension is limited to only a few connections in the area between Hulsey and Pullman Rail Yards, shown in the map above. The combined yards and connecting track are major interruptions to neighborhood connectivity: Reynoldstown from Inman Park, Little Five Points from Edgewood, Lake Claire from Kirkwood. We will design new connections at the scale of public infrastructure under and over the yards and these chosen interchanges will be the sites for fresh thinking about how we live as “collaborative consumers.”

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**Problem 2 is Global**

The grand challenge is to expand 21st housing options to meet the needs of changing urban demographics, sustainability targets and alternative energy requirements, all through smartly researched and elegantly designed housing and public space solutions. There are a number growing community based initiatives focused on understanding the new forces in play as urbanized areas like Tokyo, Seattle, Atlanta, San Francisco, and New York City work to address issues associated with the minimum standard for creating livable and affordable urban dwellings. As cities like Atlanta continue to experience a move away from satellite single family bedroom communities towards center city, mid and high-rise housing blocks, sustained focus on what constitutes a viable public and affordable private realm is needed.

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**Living Buildings**

We will take a deep dive into the The Living Building Challenge 3.1 (http://www.living‐future.org/), a building certification program, advocacy tool and philosophy that defines the most advanced measure of sustainability in the built environment possible today and acts to rapidly diminish the gap between current limits and the end‐game positive solutions. The Challenge is comprised of seven performance categories called Petals: Place, Water, Energy, Health & Happiness, Materials, Equity and Beauty. Petals are subdivided into a total of twenty Imperatives, each of which focuses on a specific sphere of influence. This compilation of Imperatives can be applied to almost every conceivable building project, of any scale and any location—be it a new building or an existing structure. The Mantra of this studio is: Prove it.

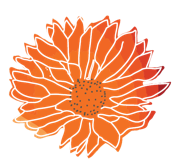
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**Spring Semester 2017**

The work from the previous year will serve as case studies for advanced design thinking at all scales. We will challenge some of the assumptions made thus far, invent new ones where needed, and refine each proposal by describing in detail various systems and environments.   Students from HPB, Biology and Engineering will serve as consultants. Model Making will be the primary mode of investigation.

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**The best way to have a good idea is to have a lot of ideas. Linus Pauling**

****The key metric for the studio is “prove it” – all of the student’s design decisions and building system selections must be justified through analysis, simulation, and calculations and must follow basic building/life safety requirements from the International Building Code. Cross-disciplinary teams of 4 will develop their multifamily housing proposals in the Atlanta region (33.88/84.30), characterizing:

* site cost and choice
* building ecology/ecological influences
* regional design influence/vernacular
* building and site design
* energy demand
* energy production
* building operational strategies
* mechanical and electrical systems
* construction specifications and building process
* initial cost estimating through development and return on investment
* risks associated with implementing new technologies
* building simulation
* life-cycle assessment

**Learning Objectives**

* Ability to establish and carry out an independent research program, to conduct rational experiments based on common hard-core assumptions, to test theories through trial and error relating to both the conceptual and the material dimensions of the project.
* Analysis, operation, construction, and cost feasibility of net zero energy buildings. The entire semester will focus on developing the building performance and assessment tools and methodologies to support the design of small-scale ecologically-sensitive residential developments.
* Understanding the role of applied research in determining function, form, and energy systems and their impact on human conditions and behavior.
* Understanding of the relationship between human behavior, the natural environment and the design of the built environment.

**Project Outline and Deliverables**

**Beltline Infrastreucture Intervention**

**3 weeks**

P1 3 weeks Analysis: Natural Elements, Site Ecology, Structure as a design driver

[diagramming, drawing, model making]

Synthesis: Model

[digital diagramming, focused drawing with emphasis on axon and section in time]

Common

Deliverables House Protoype

Structure and Systems Models and Drawings

Model and Section/Orthographic Drawings @ 1/8” = 1’-0”

**Affordable Housing Protoypes**

P2a 2 weeks Analysis: Precedents and their transformations per instructor

[digital diagramming, drawing + modeling]

P2b 8 weeks Synthesis: building type and systems development/customization

[digital diagramming, modeling analog and digital, limited drawing]

Common

Deliverables Overall Site Model

Plan, Elevation 1”=8’

3 Sections with corresponding plan details @ 1” = 8’ minimum 1 model and 2 drawings

Detail Sections | Privileged Representation

Regardless of project complexity, the ground floor must be fully articulated/resolved

Studios complete a week earlier in order to produce portfolio pages.

**Course Schedule and Assignments (subject to change)**

**January**

**Week 1**

M09 Lottery

W11 Studio Set-up: Project One, West Side Affordable Housing Charrette – 4 weeks

Full review of studio objectives,

F 13 Afternoon discussion: Energy, Zoning, Context

**Week 2**

M16 *Martin Luther King, Jr. Holiday*

W18 HPB/ARCH workday + discussion

F20 Desk Work

**Week 3**

M23 Desk Work

W25 HPB/ARCH workday + discussion

F27 Desk Work

**February**

**Week 4**

M30 Desk Work

W01 **PROJECT 1: FULL ARCH/HPB REVIEW DAY**

F03 Desk Work

**Week 5**

M06 Desk Work

W08 Project 2 Discussion: HPB/ARCH workday + discussion

discussion: Energy, Zoning, Context – scaling up

**Week 6**

M13 Desk Work

W15 **Project 2 Review: HPB/ARCH workday + discussion**

F17 Pin-up + HVAC concepts 2 and Initial Simulation

**Week 7**

M20 Simulation Review + EPC

W22 **Project 3: HPB/ARCH workday + discussion**

F24 Project Development

**Week 8**

M27 Desk Work

W01 Project 3B: HPB/ARCH workday + discussion

F03 Project Development

**March**

**Week 9**

M06 Pin up Design and Simulation

W08 **Midterm review – mandatory attendance Hinman upper review space**

F10 Project Development

**Week 10**

M13 Project Development

W15 Project 4: HPB/ARCH workday + discussion

**T 16 NYC FIELDTRIP**

**F17 NYC Fieldtrip**

**S18 NYC FIELDTRIP**

**Week 11**

M20 Spring Break

W22 Spring Break

F24 Spring Break

**Week 12**

M27 Group Discussion

W29 **Project 5: HPB/ARCH workday + discussion**

F31 Project Development

**April**

**Week 13**

M03 Peer Reviews

W05 Project 5 Review: HPB/ARCH workday + discussion

F07 Desk Work

**Week 14**

M10 Project Development

W12 Project Development

F14 Project Development

**Week 15**

M17 Exhibition Development

**W19 FINAL REVIEW** Combined Studio + Seminar Review

F21 Exhibition Development

**Week 16**

**M 23** Exhibition Development

W 25 Exhibition Development

F 27 Awards Day and Exhibit Openeing, Beaux Arts Ball

**Course Requirements**

Each student is expected to attend regularly scheduled class meetings and seminar meetings, and to complete reading assignments and participate in class discussions. Each student is also expected to attend scheduled juries and pinups, and to complete project requirements per the schedule. Attendance is mandatory throughout the studio class period (MWF 2-6pm) and work performed in the studio will be for studio only.

Studio sessions begin promptly and end as determined by each instructor. This may at times fall beyond the 6pm hour, due to the time spent with each student at the desk crit. You must address any scheduling conflicts with your studio instructor at the beginning of the semester. Please note the meeting dates for the 1pm seminar in the schedule. All-section lectures are designated; all other seminars are by section only and are organized by the instructor. If a class must be missed, you must have an approved University excuse prior to the absence. Missing three classes without an approved excuse will result in a letter grade reduction. Missing more than three classes, excused or unexcused, will result in a meeting with your instructor and the Architecture Program Office to determine a course of action.

**Course Bibliography**

**Housing Typologies**

Calthorpe, Peter. Urbanism in the Age of Climate Change. Washington D.C.: Island Press. 2011.

Heckman, Oliver and F. Schneider. Floor Plan Manual: Housing. Berlin: Birkhauser, 2011.

Green, Penelope. “Selling the Pared-Down Life.” The New York Times. 17 May 2012. 1,8.

Guzowski, Mary. Towards Zero Energy Architecture: New Solar Design. London: Laurence King Publishers, 2008.

Klinenberg, Eric. Going Solo: The Extraordinary Rise and Surprising Appeal of Living Alone. New York: Penguin Books. 2012.

Mitchell, Heidi. “Furniture Does Double Duty.” The Wall Street Journal. 7 March 2012. D1, D2.

Pelham F., George. “Efficiency Apartments.” Architectural Forum. September 1925. 147-152.

Sherwood, Roger. Modern Housing Prototypes.

Taylor, C. Stanley. “Features Which Help to Rent Apartment Homes.” Architectural Forum. September 1925. 137-142.

<http://www.lifeedited.com/>

<http://housingprototypes.org/>

<https://sites.google.com/site/microhousingideascompetition/>

<http://de.wikipedia.org/wiki/Berlin-Hansaviertel>

**Energy and Ecology**

Dunster, Bill, From A to ZED, Realising Zero (fossil) Energy Developments. Bill Dunster architects ZEDfactory Ltd, 2003.

Dunster, Bill; Simmons, Craig; Gilbert, Bobby, The ZED Book, Solutions for a Shrinking World. New York: Taylor and Francis. 2008.

Galloway, Terry, Solar House, A Guide for the Solar Designer. London: Elsevier, 2004.

Hastings, Robert; Wall, Maria, Sustainable Solar Housing, Strategies and Solutions. London, Earthscan. 2007.

Keeler, Marian and Burke, Bill, Fundamentals of Integrated Design for Sustainable Building, Wiley, 2009.

Kwok + Grondzik, The Green Studio Handbook – Environmental Strategies for Schematic Design. Oxford: Elsevier, Architectural Press, 2007)

Pearce, Annie, Yong, Han Ahn and Hanmi Global, Sustainable Buildings and Infrastructure: Paths to the Future, New York: Routledge. 2008.

Solar Dwelling Design Concepts (AIA Research Corporation and US Department of Housing, 2003).

Szokolay, Steven, 2004, Introduction to Architectural Science: The Basis of Sustainable Design, Elsevier Architectural Press.

Yannas, Simos, Solar Energy and Housing Design; Volume 1: Principles, Objectives, Guidelines. London : Architectural Association, 1994.

Yannas, Simos, Solar Energy and Housing Design; Volume 2: Examples

**The Public Realm**

de Certeau, Michel. "Introduction," The Practice of Everyday Life Berkeley: University of California Press, 1984.

Lefebvre, Henri. extracts from “The Production of Space,” Rethinking Architecture: A Reader in Cultural Theory, pp. 139 – 147.

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| Habermas, Jurgen. Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society. Cambridge: MIT, 1994. 1-180.  Negt, Oskar and Alexander Kluge. "Introduction." + "Chapter One: The Public Sphere as the Organization of Collective Experience." Public Sphere and Experience: Toward an Analysis of the Bourgeois and Proletarian Public Sphere. Minneapolis: University of Minnesota Press. 1993. xliii-xlix. 1-53. |
| Lefort, Claude. "The Question of Democracy." + "Human Rights and the Welfare State." Democracy and Political Theory. Minnesota: University of Minnesota Press. 1998. 9-44.  Deutsch, Rosalyn. "Agoraphobia." Evictions: Art and Spatial Politics. Cambridge MA: MIT Press. 1998. 267-327.  Lyotard, Jean-Francois, "Domus and Megalopolis, " Rethinking Architecture,  pp. 271-279. |

# Academic Integrity and Conduct

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. All Georgia Tech students should familiarize themselves with and abide by the Georgia Tech Honor Code <http://www.catalog.gatech.edu/rules/18/>.

Student work that presents the ideas or words of others as the student’s own adversely impacts the whole school and may lead to immediate dismissal. Academic dishonesty, including cheating, plagiarism, commissioning academic work by others, or performing academic work on behalf of another student, is strictly prohibited. All persons in the classroom are expected to behave with courtesy towards others and in a way that does not interfere with the regular conduct of the class. Cell phones are to be turned off when students enter the classroom and should remain off for the duration of class: <http://www.catalog.gatech.edu/rules/19/>

# Special Needs

# Any student with a disability, that may require accommodation, should contact Office of Disability Services at 404-894-2563 or visit <http://disabilityservices.gatech.edu> to make an appointment to discuss his or her special needs and obtain an accommodations letter. He or she should also schedule an appointment to speak with the course instructor.

# Emergencies

In case of emergency (e.g., fire, accident, or criminal act), please call the Georgia Tech Police at 404-894-2500. Please note that Perry Minyard, IT Support Administrator for the College of Architecture, is also a firefighter and an Emergency Medical Technician (EMT) certified in performing CPR.

# Ownership

Physical copies of student work submitted to the school to satisfy course requirements—including, but not limited to digital files, papers, drawings, and models—become the property of the school. It is assumed as no obligation to safeguard such materials and may, at its discretion, retain them, return them to the student, or discard them.

# Archiving

In some courses, selected students may be required to submit physical examples of their work or digital examples (on a clearly labeled CD), no later than one week after the end of term, to their instructors or administration for archiving. By enrolling, each student grants a license to reproduce and display his or her work. This is a chance for students to have their work shown online and potentially featured in forthcoming publications.

# College of Design Facility Rules and Guidelines

Please consult the Georgia Tech Student Handbook regarding the use of facilities and all Institute policies. Aerosol sprays of any kind are strictly banned from the studio and surrounding areas. A new spray painting booth is now in operation in the College of Design shop, on the ground floor of the East Architecture Building.

Shop Use: All students using shop facilities must first have completed an orientation. Safety first, always! Noise should be kept to a minimum. Music may be listened to only through headphones, including evenings and weekends.

Studio Housekeeping: Students should feel free to organize their space creatively and expressively, but with respect to others around them. Try to prevent clutter from becoming a nuisance, distraction, or a hazard. The cleaning staff makes every effort to determine what is and is not trash, but their job can be made easier if you keep drawings and models off of the floor.

**Readings**

Required reading materials will either be provided as hard copy or will be placed or on T-Square. Instructors may make readings available on other electronic sites and may distribute other readings in their section seminars. Reasonable time will be given to complete readings prior to discussion. Please understand that we are lucky to have a library in our building! Take advantage of this resource. Lectures and Events The 13th hour of Studio is the School of Architecture Lecture Series and students are required to attend. The lecture time varies on Wednesdays.

**Grades and Evaluation**

Attendance, participation, timely completion of work, the depth of engagement in studio issues, and the making of progress in your work provides the foundation for your grade. Conceptual and project development and refinement, drawing and model making requirements, and craftsmanship matter greatly and factor equally in the evaluation of your performance. Remember, grades are earned by you –not given by your instructor.

A grade of “F” indicates a failure to meet the studio requirements, including attendance, minimum requirements concerning presentation and fulfillment of studio requirements. In case of an “F”, the studio will need to be repeated.

A grade of “D” means that you have significant attendance problems, your studio performance is poor, including failure to meet deadlines, the basic requirements of the studio, and/or your project is not plausible.

In case of a “D”, the studio will need to be repeated.

A grade of “C” means that you have not met the basic requirements of the studio, but your project is plausible even if substantially undeveloped.

A grade of “B” means that you have met the basic requirements of the studio and that your project is developed to the point where evaluation can be made according to the studio’s themes and criteria.

A grade of “A” means that your project represents both a clear understanding of studio themes and criteria, and a self-motivated exploration beyond the basic course requirements. Projects that receive grades of “A” are exemplary projects in terms of concept, production, craft.

Midterm grades will be assigned and your instructor will notify/counsel any student concerning any necessary action to be taken concerning the semester Drop Day. Please refer to the Institute handbook regarding disputes concerning grades.

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Students are asked to complete the online course evaluation of all courses at Georgia Tech at the end of the term.

**Studio and Building Rules**

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