

**Course No:** 11:550:438/ SPRING 2016  
**Title:** **Material Tectonics**  
**Units** 3  
**Semester** Spring Semester  
**Grading Type** Letter Graded  
**Course Type** Seminar  
**Location** Blake Hall 128  
FAB-LAB  
**Day and Time** Friday 2:15-5:15  
**Instructor** Heather Wilkerson, AIA LEED AP BD&C  
**Office Hours** By Appointment  
**Contact Info** **heather@theprimitivehut.com**  
908.331.0546

**Course Description** This course confronts the conventional concepts behind modern building science and material applications, re-applying the processes of fabrication and methods of construction to investigate materiality, particularly in relation to tectonics, critical regionalism and sustainability. Over the duration of this course, students will be provided the opportunity to develop both a fundamental understanding of material principles and to demonstrate their application to the analysis and design of material processes. Focused on building a working knowledge of traditional and contemporary building materials, their current applications, and limitations, this investigation will focus on materials and their relationship to form.

**Course Objectives** Investigation of building science *THEORY*, and its practical application through a series of investigative assignments focusing on the physical properties of materials.

Development of a GROUP *DESIGN* project [see Project Description] including construction documentation.

Participation in the physical *CONSTRUCTION* of a full-scale design prototype for Rutgers AG day.

Integration of *INNOVATIVE MATERIAL* research and sensor technologies.

Development of *ENTREPRENEURIAL* project strategies and collaborative working relationships.

**Tools and Media** Throughout the semester we will explore the formal implications of material composition, its physical properties, and its fabrication processes at different scales (ultimately arriving at a full-scale application). We will work with a wide palette of tools for representation and fabrication (digital modeling [Rhino, AutoCAD, 3DStudio, etc.] and fabrication [laser cutter, 3Dprinter, and CAD/CAM tools, etc.]), all towards the production of physical models.

**Course Requirements** Readings as assigned (to be posted on SAKAI).  
Materials research presentation.  
Collaboration of the Design and Production of Construction Documents utilizing industry standards.  
The course will culminate in a built project. Students must be prepared to participate in the physical construction of a built product.

It is recommended that students become members of International Living Future Institute (ILFI.ORG) and join the Community of the Living Building Challenge Community. This will give you access to course materials including "LIVING BUILDING CHALLENGE 3.0" and "MATERIALS PETAL 3.0".

#### **Selected Bibliography**

Ed Allen	Fundamentals of Building Construction
Victoria Ballard Bell	Materials for Design
Gail Peter Borden	Material Precedent: The Typology of Modern Tectonics
Gail Peter Borden	Matter: Material Processes in Architectural Production
Blaine Brownell	Transmaterial 1/2/3
Cecil D. Elliot	Techniques and Architecture

John Fernandez  
 Thomas Jester  
 Chris Lefteri  
 Toshiko Mori  
 Farshid Moussavi  
 Mostafavi/Leatherbarrow  
 Thomas Thiis-Evensen  
 Richard Weston  
 Frampton, Kenneth  
 McDonough, William  
 Heidegger, Martin

Material Architecture  
 Twentieth Century Building Materials  
 Wood: Materials for Inspirational Design  
 Immaterial/Ultra-Material  
 The Function of Ornament and The Function of Form  
 On Weathering: The Life of Buildings in Time.  
 Archetypes in Architecture  
 Material, Form and Architecture  
 "Towards a Critical Regionalism: Six Points for an Arch of Resistance"  
 Cradle to Cradle: Remaking the Way We Make Things  
 Building, Dwelling, Think

## Schedule

wk	Date	2:15-3:15	3:15-4:15	4:15-5:15	Assignment	
1	January 22	Material Tectonics	Critical Regionalism	Intro to PARKlet	Reading on CR Essay Assignment	
2	January 29	PinUP	Biomimicry/ Material Fabrication	LBC and Sustainability	Biomimicry/ Fabrication Assignment	5%
3	February 5	PinUP	Project Parameters	Select Groups	Group PARKlet Conceptual Design	5%
4	February 12	PinUP	GROUP CHARRETTES		Conceptual PARKlet Design Cont'd	
5	February 19	PinUP	Select Design/ Begin Design Development Drawings		Model, Plans. Elevations, Details, Materials to 30%	10%
6	February 26	PinUP	PRODUCTION		To 75%	10%
7	March 4	PinUP	PRODUCTION		To 100%	10%
8	March 11	FAB LAB/ MATERIAL INVENTORY			Specs and Schedule	5%
March 18		SPRING BREAK				
9	Mar 25	CONSTRUCTION				35%
10	April 1	CONSTRUCTION				
11	April 8	CONSTRUCTION				
12	April 15	CONSTRUCTION				
13	April 22	CONSTRUCTION				
14	April 29	INSTALLATION				

## Equipment and Use of Facilities

The Department of Landscape Architecture requires that each student purchase an individual laptop [[http://landarch.rutgers.edu/current\\_students/laptoprequire.html](http://landarch.rutgers.edu/current_students/laptoprequire.html)]. The computer lab is not accessible when a class is in session and the FAB-LAB will have specific hours of operation. In addition, the Labs are a shared resource for the entire school body. A schedule of courses using the Lab is posted on at the entry of the Lab. Project deadlines will NOT be extended because resources were not available in the computer lab or FAB-LAB. Please plan your time accordingly.

Courses cannot be taught without reliable facilities. The student is expected to use the facilities and equipment [FAB-LAB tools, the Epilog Laser Cutter, printers, projectors, cameras, and computer equipment] responsibly with particular regard to the clearly established rules about their use as specified in the student handbook:

[http://landarch.rutgers.edu/current\\_students/student%20handbook/StudentHandbook\\_web\\_SectII.pdf](http://landarch.rutgers.edu/current_students/student%20handbook/StudentHandbook_web_SectII.pdf)  
Facilities & Equipment rules cover access to the building, vandalism, seat assignments, personalization of working spaces, smoking and drinking, use of lockers, access to the reference collection, and basic rules governing the use of the computer lab and FAB-LAB. Please note: the Department has decreed that there is no eating or drinking allowed in the computer labor in the FAB-LAB. Failure to observe these rules will result in immediate revocation of access to the lab[s].

### **Student Obligations and Expectations**

This class is offered for three credits with a three-hour class meeting on Fridays [2:15 – 5:15 pm]. This course satisfies the Architecture elective course requirement within the accredited B.S. Landscape Architecture degree in the School of Environmental and Biological Sciences.

### **In addition to Course Objectives, Students are required to:**

1. Complete all weekly readings on time and participate in the weekly discussion.
2. Complete all weekly assignments on time. Late homework will NOT be accepted.
3. Maintain a course sketchbook.
4. Come to class on time and get settled promptly. Late arrivals will be marked as an absence.
5. Seek help, when needed, during office hours and in advance of an assignment's due date.
6. Personal computers and FAB-LAB equipment are to be used for course related work only during class time. Students are NOT allowed to access the Internet or work on non-course related topics during class time.
7. Turn OFF all mobile devices during class time and when in the FAB-LAB.

Mobile devices are not to be used except for emergency purposes only. Students who repeatedly have an issue with cell phone use will be asked to leave the classroom and/or have their LAB access revoked.

### **Indemnification Agreement**

This course will involve extensive use of the Fabrication Laboratory [FAB-LAB] and the full-scale construction of student work, as well as, travel off-campus for field trips. As in all design-build work, safety is the paramount concern. Students in this course will be required to attend instructional sessions on shop safety and machine basics, as well as, demonstrate to a faculty member, safe and efficient use of each piece of equipment in the FAB-LAB which the student intends to use in accordance with Departmental procedures. By registering for the course, the student understands the dangers involved in 4 | 11:550:438 SP16 MATERIAL TECTONICS design-build research and construction and agrees to not use any piece of equipment upon which they have not been trained or do not feel comfortable. Further, the student agrees to follow all of the rules and regulations of Rutgers, The State University of New Jersey safety standards, the FAB-LAB, and specific rules of the Material Tectonics course. The student understands that the Lab is an integral part of the course and will not use the Lab for any work outside of the parameters of this specific course and understands that they are responsible for the proper use and maintenance of the lab and the equipment herein. The student fully understands and agrees that failure to abide by any of the rules and regulations set forth by the University, in the FAB-LAB, or in the course, will be cause for immediate revocation of access to the FAB-LAB. Exceptions will not be made for completion of course work. The student understands that these rules and regulations can be updated at any time and it is their responsibility to remain aware of changes posted in the FAB-LAB or online in the course Sakai Worksite. The student will sign hold harmless/indemnification agreements with the Department of Landscape Architecture and Rutgers, The State University of New Jersey for all course related field trips and all FAB-LAB use. If you encounter any personal circumstances that inhibit your ability to fulfill the requirements of this course, you should immediately contact the instructor. In addition, any student with a special need, circumstance, or disability, should make an appointment to see the instructor during the first week of classes.

### **Attendance**

The Department of Landscape Architecture requires attendance in all of its classes. All studio and lecture sessions are mandatory. The individual student's development as a landscape architect is largely dependent upon two aspects of education. First, is the exposure to and assimilation of a body of information which relates to the field. Second, is the application of this knowledge through studio projects and problem-solving skills developed through critiques, reviews and interactions during each project. The Rutgers Landscape Architecture curriculum is designed to develop both areas. Attendance and participation in all lectures and studios are essential if the student is to achieve his/her maximum potential. There will be no opportunity to make up a missed jury, in-class exercise or lecture.

It is the policy of the Department that more than three unexcused absences will result in a step reduction of the final course grade [for example, a B down to a C]. Each additional three absences will result in another step reduction. If a circumstance arises beyond your control, please notify the Instructor 24-hours prior to the class meeting, and an alternate arrangement will be made. Per Department policy: documented medical and family emergencies are, of course, excused. Students on academic probation have no allowable unexcused absences. A minimum level of participation is defined as being in attendance for the entire duration of a class session. Students may not leave the class prior to the official end time of class

unless the Instructor has officially dismissed the students. Employment schedules, holiday travel and personal plans should be made in accordance with the course schedule. Attendance at reviews and guest lectures is mandatory for the entire duration of the session. Please note that attendance is taken at the start of class, late arrivals will be marked as an absence.

### Assignments

Students will be given weekly assignments at the end of each class meeting. Homework assignments are due by the start of class the following week. LATE HOMEWORK WILL NOT BE ACCEPTED. If a student misses a class, whether excused or unexcused, it is the responsibility of the student to acquire the missed lecture's information, assigned reading, and modeling / design assignment and submit the work on time. Except for documented circumstances truly beyond the student's control, all projects including Final Research project are due on the 5 |11:550:438 SP16 MATERIAL TECTONICS dates and at the times specified. Projects that are incomplete on the due date should still be submitted on the due date in their incomplete state, to receive at least partial credit. Any project work submitted late will lose a letter grade for each day past due. Working beyond a due date is both unrealistic in a professional setting and unfair to classmates who have completed their work on time.

### Grading

Final grade evaluations for this seminar will be based on the following breakdown:

CR Essay/Precedents PinUp	5%
Biomimicry/ Fabrication	5%
Group PARKlet PinUp	10%
Design Development 30%	10%
Design Development 75%	10%
Design Development 100%	10%
Specs and Schedule	5%
Construction/ Installation	35%
Attendance/ Participation	10%

### Final Course Grades:

All course grades are related to the following numerical scoring system [where x = your grade]. Your final course grade is computed by cumulating each score received throughout the semester and weighted by the percentages given above.

x > 90 A  
90 > x > 87 B+  
87 > x > 80 B  
80 > x > 77 C+  
77 > x > 70 C  
70 > x > 60 D  
x < 60 F

While the assignment of grades is ultimately the purview of the instructor, the department uses the following guideline for understanding appropriate grading in its courses:

A – Outstanding – This not only means fulfilling the requirements, but impressing and going beyond the initial expectations and assigned elements of the project. The student has demonstrated a superior grasp of the subject matter coupled with a high degree of creative or logical expression, individual initiative, and a strong ability to present these ideas in an organized and analytical manner.

B – Very Good – The student has demonstrated a solid grasp of the material with an ability to organize and examine the material in an organized, critical, and constructive manner. The projects and in-class performance reveal a solid understanding of the techniques, issues and related theories, with some additional work completed.

C – Acceptable – The student has shown a moderate ability to grasp concepts and theories for the class, producing work that, while basically adequate, is not in any way exceptional. The performance in class displays a basic familiarity with the relevant literature and techniques.

D – Unacceptable – The work demonstrates a minimal understanding of the fundamental nature of the material or the assignment with a performance that does not adequately examine the course material critically or constructively. Students cannot graduate from the Landscape Architecture program with Two [2] D's in required 550 classes.

F – Failure – The student has demonstrated a lack of understanding or familiarity with course concepts and materials. Their performance has been inadequate. Failure is often the result of limited effort and poor attendance which may indicate that the student is not in the proper field of study.

\*Note: A letter grade of "C" is simply attending class and completing assignments & projects as prescribed. 6 |11:550:438 SP1 4 MATERIAL TECTONICS

It is the responsibility of the student to track his or her own academic progress throughout the semester. Interim grades will be available to students on an individual basis. Students should make an appointment with the instructor to review interim grades. Appointments must be made at least one week in advance of any meeting.

### Work Becomes Department Property

Submitted drawings, models, photographs, or written papers for any project assigned in Landscape Architecture courses are considered the property of the Department and may be retained in its archives for exhibition and accreditation purposes. All projects will be graded and returned to the student at a location designated by the instructor. Should your drawings be retained by the Department for its professional accreditation or for purposes of exhibition, you will be given the opportunity to obtain a print, scan, or photographic record of your work. Department files are OFF LIMITS to students.

**Violations of the University Integrity Policy**

The intentional copying of another student's work [file] or a portion of a work [file] and representation of the work as your own work is in direct violation of the University Integrity Policy:

**Plagiarism:** Plagiarism is the representation of the words or ideas of another as one's own in any academic work.

**Facilitating Violations of Academic Integrity:**

It is a violation of academic integrity for a student to aid others in violating academic integrity. A student who knowingly or negligently facilitates a violation of academic integrity is as culpable as the student who receives the impermissible aid, even if the former student does not benefit from the violation. As a result, any copying and/or "sharing" of exercises, homework assignments, and projects will be treated as Level 2 violations and subject to the sanctions as outline in the Integrity Policy:

1. A failing grade on the assignment.
2. A failing grade for the course.
3. Disciplinary warning or probation.

Repeat violations will be treated as separable Level Three violations and referred to the AIF of the school for adjudication.

Please refer to the complete Integrity Policy at: <http://academicintegrity.rutgers.edu/integrity.shtml>.