**ARCH 6020 ARCHITECTURE MODELING AND MEDIA 2**

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

Office: RM. 109, Old Architecture Bldg. Office hours: please e-mail for appointment – M + W 11:00 – 12:00

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Graduate Teaching Assistant: Anne McCarthy - e-mail: xxxxx

**SYLLABUS** 

Zaha Hadid - Contemporary Art Musem in Calabria

**Course Description and Learning Objectives**

This course is an introduction to design computing and to the relationship between manual and digital drawing.

The basic premise of the course is that of linking architectural practices that involve space, light, movement, the path of the sun, etc. to digital modes of study and representation. This introduction is aimed at fostering the development of cognitive and design practices that use digital media in a constructive and substantive way, so that the student may begin to think architecturally in the digital/electronic realm. The second premise of the course is that all digital media share certain basic conventions between them. So, for instance, learning how to work in Adobe Illustrator, prepares one to work and think in the environment provided by 3dStudio max. There are a lot of similarities and analogies between software and being aware of them allows us to use one, or more media in the conception, representation and promotion of architectural projects. The course, as introduction, will highlight the common elements between software that the students will use, and will become more proficient users, or experts in the future.

This particular section of the course addressing Core II students is conceived and delivered in a sequence that corresponds to the assignments, concepts, skills and ideas taught in Studio. In some instances this relationship is that of complementing the content and requirements of the studio, sometimes there will be an antithesis drawn between two modes of thinking and of representation, and most of the time the relationship will be evident and will stand as a complement to Studio work.

The basis of architectural drawing and representation is that of projection. Projection is a method by which we depict a three-dimensional object in two dimensions while trying to maintain, as much as possible, most of its constituent properties and characteristics. Projection and geometry go hand in hand and, as you will see, manual modes of representation are limited by the tools available and by the fact that we rely entirely on Euclidean geometry for the description of spaces, materials and structures. Digital media, on the other hand, allow us to explore complex forms, to manufacture and build with the use of machines that interpret our drawings in real materials in the real world. The most productive use of digital media is achieved when we are able to use this technology and to integrate it in our way of thinking as a set of cognitive and computational extensions, prostheses, to our minds and bodies.

Digital and manual media are based primarily on Euclidean Geometry and on a system of orthographic projections. In the instances where we deal with the intersection of solids of varying forms, we resort to descriptive geometry. In my opinion regarding the use of geometry, manual media privilege an intelligible approach to design. (By intelligible I mean that we have to know Euclidian Geometry and Descriptive Geometry in order to draw, and conceive our designs) Digital media, on the other hand privilege an approach that relies more on perception. We perceive that we draw circles, intersect solids, etc. but we don’t have to know how this happens. (We don’t have to know the rules of math and geometry behind the operations). The necessary knowledge lies in the computer and in the software. It is “blackboxed”. The designer inputs data and the program outputs results. This is a very exciting time for all of us and the more we learn, the more we enjoy the variety of means for design, representation, implementation and thinking that our current technological development affords us.

The students will be introduced to different software that work primarily with vectors, bitmap images, solids and surfaces, and if there is time toward the end, with animations. The instruction will be based in drawing parallels between different programs and in demonstrating to the students the common logic behind a lot of the software architects use. For instance Boolean operations (based on mathematics and set theory), are common to programs such as Rhino, AutoCad, Photoshop, Illustrator, Internet Explorer, etc.

**Course Procedure and Organization**

The course is organized around two meeting times per week. The first meeting, on Mondays, consists of a lecture. Most of the time these lectures will focus on cultural, architectural and material issues as those pertain to digital design media. During this time the instructor will introduce the assignment of the week and will demonstrate the key moves necessary to complete the assignment. For most of the assignments PDF files will be available to the students demonstrating the process used and the major commands. The second meeting, on Wednesdays, is “lab” time. During this time each student will occupy a workstation and work will be done for the completion of the assignment. The instructor and the Graduate Teaching Assistant will be there to assist the students and to answer questions. As the semester progresses and the overlap between the course and the studio intensifies, some of the questions and issues arising from the assignment will be clearly related to the production of Studio work.

The particular challenge of teaching and of being a student in this course is related to the different levels of expertise that the students possess. This is especially evident at the beginning. Some of you may find at times some of the assignments and some of the instruction difficult, while others may find the same material easy and redundant. The goal is to have all students reach a similar level of competency and understanding at the end of the semester. Please be patient, ask for help and help each other. Please do not hesitate to ask questions!

Most architects and artists using digital design media know that in order to achieve their design goals they need to use a whole series of different software. Despite their many similarities, not all programs perform in the same way, so we need to know what to use in order to achieve our desired outcome. More often than not we “jump” from one to the other in order to complete a task. The course will replicate part of this process. For instance, we may use 3dmax only for the construction of topographical models and for studies of the sun as it moves during the different seasons over the same site and building, Illustrator as a means of presenting this study and Autocad as a means of producing floor plans, sections, etc.

The class assignments are due on the date posted in the individual assignment sheets. The course will have a folder dedicated to it in the School intranet system. Your completed work will be submitted in that folder unless otherwise specified. Students are required to submit the original files of their work, in the software assigned for each exercise. For instance, if you are asked to create a movie of the shadows created on a particular building (using 3dStudio), you will have to submit both the movie and the original file from which the movie was created

**Course Requirements**

Regular attendance is mandatory. The successful completion of this course entails the successful completion of the ten assignments in the syllabus. There is no final exam. Instead, as final exam I will consider your final studio presentation and the demonstration of the different skills and insights you have culled from this course. The final assignment is considered to be part of your final studio presentation. The assignments form part of your final grade in the following manner: 0 = 10% + 1st = 15% + 2nd=15% + 3rd = 5% + 4th = 5% + 5th = 5% + 6th = 5% + 7th = 10% and the final assignment, is 30% of your grade.

**Course Schedule – Topical Outline**

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| **wk** |  |  |  |
| **1** | ***august*** | ***22*** | First day of class - introduction of orthographic projections – Assignment 0: Construct a polyhedron using chipboard. Use plumb bob to project polyhedron on a piece of paper. Students work in pairs of two. |
|  |  | ***24*** | Students print nets – make models |
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| **2** |  | ***29*** | Students work in teams of two to draw projections. |
|  |  | ***31*** | Work on the first assignment continues in studio – projects are due at the end of class |
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| **3** | ***september*** | ***5*** | Official school holiday |
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|  |  | ***7*** | Printing in Acrobat - Saving Acrobat files – Using Bridge as a Database – Creation of PDF portfolio in Bridge |
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| **4** |  | ***12*** | First Illustrator tutorial: Pen tool – blend tool – pathfinder. First assignment issued. Students work on part (1) |
|  |  | ***14*** | Second Illustrator tutorial: Symbol tool – manipulation of symbols – line weights – fills and gradients. Students work on second assignment (1a). |
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| **5** |  | ***19*** | Third Illustrator tutorial: Booleans in illustrator – Out of gamut colors in Adobe suite – Layers – Gradient mesh. Students work on assignment. |
|  |  | ***21*** | Work on assignment in class – Questions answered and problems addressed. |
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| **6** |  | ***26*** | Illustrator art boards - Tiling work – Portfolio in Illustrator. |
|  |  | ***28*** | Introduction to 2D Autocad 2012. Placing an image file in Autocad – lines and polylines – selection methods. Second assignment issued (2-a): Drawing and tracing on an image. |
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| **7** | ***october*** | ***3*** | Introduction to 3D Autocad – Workspaces - Construction of Three-dimensional model in Autocad. -- Assignment (2-b) issued: Construction of a 3D model based on a painting. Due date for (2-a). |
|  |  | ***5*** | 3D Autocad. Modification of surfaces. Lofting, revolving, etc. |
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| **8** |  | ***10*** | Sections, Model space and drawing space, viewports in drawing space. Scaling drawings. Work in class, (2-b) due at the end of class. (2-c) issued. (2-c): Prepare a layout for printing the model. |
|  |  | ***12*** | Line weights in Autocad - Layers and line weights combined - ctb files. Assignment(2-d) introduced: Plot the drawings at specific scales – Choose line weights and apply them according to color and layer. |
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| **9** |  | ***17*** | fall recess |
|  |  | ***19*** | Work on assignments 2-c and 2-d in class. |
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| **10** |  | ***24*** | Assignments (2-c) and (2-d) due at the end of class. |
|  |  | ***26*** | Introduction to Photoshop – Selections - Assignment 3 issued. |
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| **11** |  | ***31*** | Photoshop and Illustrator palettes, exchange of paths and swatches. Consistency between drawings and programs. Printing. Assignment 3 due. |
|  | ***november*** | ***2*** | Color consistency in Photoshop, Illustrator and InDesign. |
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| **12** |  | ***7*** | Hue and saturation – Levels – Curves - Assignment 4 issued: Photoshop Collage. |
|  |  | ***9*** | Perspective in Photoshop – Assignment 5 issued. |
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| **13** |  | ***14*** | 3dMax Introduction – Nomenclature – Primitives – Topological Levels - Site construction using contours. Stepped and smooth model - Assignment 6: Construct the topography of a site using the tools introduced in the lecture - Assignments 4 and 5 due. |
|  |  | ***16*** | Construction of a simple model - Sunlight system - Sun animation - Assignment 6: Construct a simple model of studio project. Cast shadows on site. |
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| **14** |  | ***21*** | Fundamentals of materials in 3dMax. Assignment 6 due at the end of class. |
|  |  | ***23*** | Clipping planes and sections. Reflections and Glass. Construct an assemblage of forms and assign each form a different texture. Assignment 7 issued. |
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| **15** |  | ***28*** | Final Project (Assignment 8): Work on Studio project presentation. Students who are working on manual drawings for studio will work on a different project for this class. Assignment 2 due at the beginning of class. |
|  |  | ***30*** | Work on final project. |
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| **16** | ***december*** | ***5*** | Work on final project. |
|  |  | ***7*** | Last day of in class work. Final Project, (Assignment 8) to be submitted after the Studio’s final review. |

**Evaluation Criteria / Policy on Absences**

Three unexplained absences will result in the loss of one letter grade. Assignments are due when noted in the syllabus. . I will be looking at the way your files are structured, saved and printed. I will also be looking at how well a student followed the instructions for the assignment and, most of all, how a student went “beyond the basic requirements of the assignment”. Other criteria for evaluation include the timely completion of the assignment, the thoroughness and neatness of execution and the inventiveness and imagination in the execution of each assignment. This is specifically pertinent to the last assignment that is immediately related to the production of studio work and the completion of the semester. *Remember: Grades are earned by you, not given by the instructor.*

The general grading policy is as follows:

* A grade of “F” indicates a failure to meet the class requirements, including attendance, minimum requirements concerning presentation and fulfillment of class requirements.
* A grade of “D” means that you have significant attendance problems, your class performance is poor, including failure to meet deadlines, the basic requirements of the class, and/or your assignments are completed in a minimal manner.
* A grade of “C” means that you have not met the basic requirements of the studio, but your assignments are minimally done and display little competency.
* A grade of “B” means that you have met the basic requirements of the class and that your assignments are developed well.
* A grade of “A” means that your work represents both a clear understanding of class 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.

**Bibliography: Required/Suggested Readings**

The instructor will provide the students with PDF files that are based on the assignments and demonstrations of the major moves necessary for the completion of the work required in the course. In addition we will read chapters from the following books:

• Kalay, Yehuda, Architecture's New Media: Principles, Theories, and Methods of Computer-Aided Design, MIT Press, 2004.

• Mitchell, William, The Logic of Architecture: Design, Computation, and Cognition, MIT Press, 1990.

• Mitchell, William, The Reconfigured Eye: Visual Truth in the Post-Photographic Era, MIT Press, 1992.

• Videos and tutorials from Autodesk ,Rhino and Adobe.

# **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.