SECTION 6:

ABRIDGED COURSE SYLLABI
CARNEGIE MELLON UNIVERSITY 2007 - 2011
(reverse chronological order)

IDM2

Introduction to Digital Media 2

Carnegie Mellon University
School of Architecture
Spring 2011

Course Information

Instructor: Jeremy Ficca jficca@cmu.edu
Office hours: M/F 11:30-12:30 MMCH 201 (by appointment)

Teaching Assistants: Madeline Gannon mgannon@cmu.edu
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Times and Locations:
Lecture: Monday 10:30-11:20 | MM 103
Lab A: Wednesday 10:30-11:50 | HL CLSTR
Lab B: Friday 10:30-11:50 | HL CLSTR

Help Sessions: TBA

ONLINE:
http://www.andrew.cmu.edu/course/48-125

Overview

Software and hardware have been used in the design disciplines for quite some time, initially as instruments of efficiency and representation and subsequently as design and production tools. As design and fabrication processes become increasingly reliant upon evermore-sophisticated tools, a designers process vacillates between virtual simulation and physical reality; two-dimensional material limits and three-dimensional constructed form. As a result, the designer of today and tomorrow must be capable of understanding the various forms of translation facilitating these shifts and the potential to significantly alter the design process resultant built form.

This is the second component in the digital media introductory course sequence within the School of Architecture. The course content and projects build upon the lessons of last semester and are principally focused on the various forms of translation between 2d and 3d as well as virtual and physical models.

Course Objectives

Impart students with a repertoire of digital design techniques and the critical thinking skills to better leverage the design potential of digital media throughout their education.

Students enrolled in this course will:
1: apply various digital and analog tools in the context of design problems
2: understand and apply basic concepts of digital fabrication
3: understand the relationships between two and three-dimensional geometry in digital modeling software
4: apply laser cutting to produce physical objects from virtual models
5: understand methods to construct three-dimensional form from planar material, facilitated through digital fabrication
6: apply advanced rendering tools to produce realistic architectural simulations including natural and artificial light
7: apply time-based modeling software to generate design iterations

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Expectations

This course is NOT strictly skills based. While techniques will be addressed through the lab sessions, bias will be placed on developing critical thinking skills that transcend a particular software application and promote a deep engagement of digital media and its relationship to architecture and design. Students will be expected to further explore the material addressed in class through weekly readings.

The assignments for this course are independent from studio until spring break, after which both courses will be tightly integrated. Weekly lectures will provide an introduction to the material subsequently addressed in the lab sessions. The lectures provide a contemporary context for the utilization of digital media related to the processes of design and making.

Additional material will be posted on the website and/or distributed in class on an as needed basis.

Readings
There is a reading list that accompanies the weekly lectures. I will often reference the readings and work contained within. You are strongly encouraged to familiarize yourself with the readings and the associated projects as most are significant to the topics at hand and the discipline in general. A written response to each reading will count as extra credit towards your final grade. See 'extra credit' for additional information.

Course Organization

IDM2 has two distinct components:

1: Lectures - Introduction to underlying concepts, theories and practices
2: Labs - Immersive instruction, case study examples

Operating Procedures

Attendance
Due to the nature of course instruction, attendance and on time arrival to BOTH the lecture and lab is critical and required. Attendance will be logged at the beginning of each course. You are allowed 1 un-excused absence, **each absence there after results in a 5-point deduction from your total grade**. Logging attendance for absent students is strictly forbidden. All students involved will receive a half grade deduction from their total grade.

Distractions
Use of Cell Phones, Pagers and all other communication devices is strictly prohibited during class time. STUDENTS USING ANY FORM OF CHAT OR PEER-TO-PEER SOFTWARE WILL BE ASKED TO LEAVE CLASS.

Assignment completion
Each assignment must be uploaded to blackboard and viewable by the time specified. **Late assignments are not accepted and receive a grade of 0.**

Sickness and emergencies
Please contact me if you must miss class for sickness or other another emergency. This will enable us to discuss the duration of missed classes and plan as best to prevent you from falling behind.

Disabilities
Students with disabilities should contact me to schedule a meeting to discuss academic accommodations. Please be prepared to provide the university accommodation letter.

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Evaluation and Grading

A – R grading convention is used in this course. All grades are earned!

A Highly advanced technical and design skills clearly evident through consistently rigorous work. Proven experimentation with various media. All assignments completed on time.

B Above average technical and design skills. Marked development in design and technical skills over the course of the semester. Potentially 1 missed assignment.

C Produces average work that fulfills the bare requirements of each assignment. Potentially 2 missed assignments.

D Assignments lack the depth of understanding for the issues at hand. Work is insufficient and incomplete. Potentially 3 missed assignments.

R Requirements of course not met. Missing more than 3 assignments.

Project weighting

15%	project 1
10%	project 2
20%	project 3
20%	project 4
15%	project 5 – studio coordinated
20%	Project 6 – studio coordinated

Extra credit

5 points	A thoughtful half page typed response to **all five** of the assigned readings will result in the addition of 5 points to your final grade. I am not interested in a synopsis, but rather YOUR reaction/reflection to/of the readings.

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Project 1: Fabricating Contours *(2d > 3d and back again)*

Description

This project serves as an introduction to fundamental relationships between virtual design and physical implementation. Furthermore, the process will address correlations between volume and surface as well as basic methods of digital fabrication. The charge is quite simple; utilize a contouring process to fabricate a self-supporting physical object that reveals a geometric surface transformation while preserving the geometric relationships established in the provided virtual model. This will require sufficient points of contact with the table surface to provide stability and predictable object positioning. Given the relatively limited amount of material you are provided with, a design strategy that is materially efficient, yet stimulating is paramount.

Goals

Understand the geometric relationships between 2d line geometry and 3d surface geometry.
Utilize lofting and contouring to generate contour geometry.
Apply a basic digital fabrication workflow that utilizes software and hardware to move between 3d and 2d.
Utilize laser-cutting to precisely create sections.

Specifics

Your model must be self-supporting and stable. To achieve proper alignment with your neighbor, the boundary curves must rest exactly at the same elevation above Z 0 as in the digital model.

Size of finished model:	10" along X-axis 15" along Y-axis
Section frequency:	sections along Y-axis - every 1/8" (the thickness of one sheet of cardboard)
Material, Assembly and Craft:	You will be given 4 sheets of 1/8" thick 24" x 36" white faced cardboard (provided by dFAB and billed to your student account) Your object sections will be nested on these sheets in preparation for laser-cutting Two 1/8" alignment wood dowels will run through the object to facilitate registration and gluing (dowel location is indicated in the virtual 3d model) I expect the highest level of craft. Objects that meet the criteria will be displayed in a gallery context.

Schedule:

1.10	Project assigned	
1.12	dFAB laser cutting workshop 1 with Zach Ali	4:30 – 5:15pm
1.12	dFAB laser cutting workshop 2 with Zach Ali	5:15 - 6:00pm
1.14	dFAB laser cutting workshop 3 with Zach Ali	4:30 – 5:15pm
1.14	dFAB laser cutting workshop 4 with Zach Ali	5:15 - 6:00pm
	There are block lasercutter reservations from Jan 18 – Jan 31 for 5pm-7pm	
	Signup procedures will be discussed during the workshop	
1.31	Project due in CFA great hall at 10:30AM	

Grading and Evaluation Criteria

Project 1 equates to 15% of the final grade.
You will be graded on the following criteria:
Fidelity of implied surface
Transformation of surface from 'bookend' contours
Craft of assembly

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Project 2: Analytical Drawing

Description

Produce a composite drafted drawing, utilizing two and three-dimensional drawing conventions. The drawing shall be composed of the following: 1:1 shaded plan, 1:1 longitudinal section, axonometric.

Goals

Understand the Rhino – AutoCad – Illustrator workflow
Utilize projective view tools to generate 2D line drawings from 3D geometry
Utilize layers and transparency to achieve visual complexity while retaining logic

Specifics

Virtual output: PDF
Physical output: 18" x 24" plot (landscape orientation and cut to size) on Strathmore or Arches hot press paper

Schedule:

1.31 Project assigned
2.7 Project due at beginning of class

Grading and Evaluation Criteria

You will be graded on the following:

- Completeness of drawings
- Utilization of line-weight and tone
- Graphic Composition

Project 2 equates to 10% of the final grade.

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Project 3: Building Section

Overview

For project 3 and 4, the class will be assigned 4 canonical North American Louis Kahn buildings to serve as the basis for architectural analysis and representation. The projects are assigned alphabetically as follows: [A-C] Esherick House; [D-G] Kimbell Art Museum; [H-L] Phillips Exeter Academy Library; [M-P] Fisher House; [Q-S] Salk Institute; [T-Z] Yale Center for British Art. Projects 3 and 4 will require the construction of a digital model of your assigned building. This will serve as the geometrical basis for the various facets of both projects.

Description

Using the underlying geometric principles and basic dimensions of the assigned buildings, you are to construct a three-dimensional rhino model that will subsequently be used to complete projects 3 and 4. Therefore, it is critical to produce an accurate and detailed model. You are not permitted to scan and trace drawings as it will not preserve the geometric principles and prove less accurate as a method. For project three, you will cut a section through your three-dimensional Rhino model of the assigned building and use AutoCad to further embellish the resulting two-dimensional drawing to add information and lend scale. While this section can be cut anywhere through the building, you are challenged with finding the most informative location.

Workflow

Successful completion of this project will require the use of AutoCad for drafting, Rhino for three-dimensional modeling and Adobe Illustrator for final layout and printing. It must be obvious that geometric construction lines have been utilized in the creation of the drawing and model. These should be placed on a unique layer and not deleted.

Goals

Understand the virtual modeling and architectural drawing workflow in Rhino and AutoCad
Create a legible and detailed architectural drawing

Resources

Books containing dimensioned drawings of the four Kahn buildings are on IDM2 course reserve in the library.

Specifics

Virtual output: ZIP archive that includes: 2d AutoCad drawing, 3d Rhino model, final PDF
Physical output: 18" x 24" plot (landscape orientation and cut to size) on Strathmore or Arches hot press paper
One sheet for the section drawn at ¼" = 1'-0"

Schedule:

2.7 Project assigned
2.28 Project due at beginning of class

Grading and Evaluation Criteria

You will be graded on the following:

- Level of information conveyed through section
- Use of construction lines in geometry creation made evident through existence in files
- Completion of three-dimensional model
- Clarity of drawings through use of line-weight, tone, etc.

Project 2 equates to 20% of the final grade.

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Project 4: Hybridized Building Section and Analytical Diagram

Overview

For project 3 and 4, the class will be assigned 4 canonical North American Louis Kahn buildings to serve as the basis for architectural analysis and representation. The projects are assigned alphabetically as follows: [A-C] Esherick House; [D-G] Kimbell Art Museum; [H-L] Phillips Exeter Academy Library; [M-P] Fisher House; [Q-S] Salk Institute; [T-Z] Yale Center for British Art. Projects 3 and 4 will require the construction of a digital model of your assigned building. This will serve as the geometrical basis for the various facets of both projects.

Description

Using the base three-dimensional model created for project 3, you are to describe your building through two distinct representational methods, a perspectival section and an analytical drawing. The successful completion of these “drawings” will require the use of both raster and vector drawing methods to produce seamless hybridized products. Both drawings must utilize rendering in some form to communicate the quality of light within the chosen spaces. While this section can be cut anywhere through the building, you are challenged with finding the most informative location to cut your section.

Goals

Understand the virtual modeling and architectural drawing workflow in Rhino
Understand how to utilized virtual lighting and rendering to simulate the play of light within a virtual model
Understand basic VRay Rhino rendering techniques
Create a legible and detailed architectural drawing

Resources

Books containing dimensioned drawings of the four Kahn buildings are on IDM2 course reserve in the library.

Specifics

Virtual output:	PDF uploaded to Blackboard (page size must be 18” x 24” landscape orientation)
Physical output:	Schedule:
	2.28 Project assigned
	3.21 Project due at beginning of class

Grading and Evaluation Criteria

You will be graded on the following:

- Level of information conveyed through section
- Manipulation of light through your spaces
- Rendering and drawing quality
- Clarity of drawings through use of line-weight, tone, etc.

Project 2 equates to 20% of the final grade.

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Project 5: TIME-BASED DIAGRAM

Description

You are to utilize animation techniques to produce a time-based diagram of your studio project. The result should be understood as a communicative device in which the animation of form reveals the formative logic and intent of the project at hand. As such, the intent is diagrammatic clarity rather than cinematic representation.

Goals

Critically utilize 4d media to communicate intent
Develop an understanding of the basic animation tools within 3ds max
Understand and apply global illumination and aspects of indirect lighting

Specifics

Duration:	15 seconds @ 20fps
Size of Output:	TIFF frames @ 480 pixels by 270 pixels
File Format:	QuickTime movie (*.mov)
RAM Player *.mov Compressor:	Choose H.264 under compressor type and Best for quality
File name must use Andrew ID:	ficca_6.mov (ex)

Schedule:

Due: 5.9 due to Blackboard by Noon

Grading and Evaluation Criteria

You will be graded on the following:

- Conveyance of intent
- Control of camera(s), light(s) and objects
- Fidelity and completeness of 3d model

Project 5 equates to 15% of the final grade.

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Project 6: SEQUENCE RENDERINGS

Description

You are to generate an evocative sequence of rendered images that illustrate the spatial conditions found throughout your studio project. The play of light and composition of view are critical components and must receive careful consideration. Similar to a film story-board, the image sequence should be understood as a device that can imply movement, allude to conditions not fully captured within the frame and provide evidence to where one has been and is approaching.

Goals

Understand the Rhino – VRay workflow
Apply exterior and interior lighting
Understand and apply global illumination and aspects of indirect lighting
Understand and apply simple material attributes

Specifics

Virtual output: 4" x 24" PDF of rendered sequence (6 renderings)
Physical output: Used in your studio review
Schedule:

4.4 Project assigned
5.2 Project due to Blackboard by 5pm

Grading and Evaluation Criteria

You will be graded on the following:

- Completeness of model
- Placement of cameras and choice of views
- Placement of lighting and control of tonal range
- Utilization of basic material settings

Project 6 equates to 20% of the final grade.