

Arch 3690

Intermediate Computation and Fabrication

Tue. 11:30 pm - 1:30 pm | Fri. 11:30pm - 1:30pm

Prof. Joseph Vidich (jvidich@citytech.cuny.edu)

Prof. Charlie Able (cable@citytech.cuny.edu)

Department of Architectural Technology
New York City College of Technology
City University of New York
300 Jay Street, Brooklyn, New York 11201

COURSE SYLLABUS

Department of Architectural Technology | B. Tech. in Architectural Technology

ARCH 3690 Intermediate/Advanced Parametric Computation and Digital Fabrication

4 lab/studio hours, 6 credits

Prerequisites: ARCH 1160 Visual Studies I and ARCH 1260 Visual Studies II, or CMCE XXXX

COURSE DESCRIPTION:

This course, the second in the digital fabrication certificate sequence (following ARCH3290) focuses on the development of parametric tools and digital prototyping techniques and practice. Beginning from the study of precedents of modern architectural fabrication—both digital and non-digital-- the course will develop a comprehensive understanding of exemplary construction and tectonic systems, as well as allowing students to develop a proficiency in applying this knowledge in constructing associative/parametric digital models that utilize tools to generate alternative variations of these systems.

An integral part of the course involves the study of parametric modeling in Rhino 3D, Grasshopper, and Paneling Tools, and Bentley Generative Components, and scripting in Visual Basic (or equivalent), with dedicated workshops on geometry and linear algebra for 3D modeling. The output of the course will be a digitally modeled and fabricated panel, with paneling systems involving complex curvatures. Students will have come away from the course with digital and material models, and documentation of the structural characteristics of the materials and fabrication techniques used.

REQUIRED TEXT:

Alayna Fraser, "Translations: de Young Museum and the Walker Art Center," Praxis 9, 2007

An Atlas of Fabrication, Barkow Leibinger, AA Publications, 2009

Digital Fabrication: Architectural and Material Techniques, Lisa Iwamoto, Princeton Architectural Press, 2009

Tooling, Pamphlet Architecture 27, Aranda/Lasch, Princeton Architectural Press, 2006

RECOMMENDED TEXTS:

The Function of Ornament, Farshid Moussavi and Michael Kubo, Actar, Barcelona, 2008

The Function of Form, Farshid Moussavi, Actar, Barcelona, 2009

Atlas of Novel Tectonics, Reiser + Umemoto, Princeton Architectural Press, 2006

Studies in Tectonic Culture. Kenneth Frampton, Cambridge, MA: MIT Press, 1995.

The Nature and Art of Workmanship, David Pye, Herbert Press, London, 1995

The Nature and Aesthetics of Design, David Pye, Herbert Press, London, 1978

Architecture in the Digital Age: Design and Manufacturing, ed. Branko Kolarevic, Taylor & Francis, New York, 2003

Refabricating Architecture, Stephen Kieran + James Timberlake, McGraw-Hill, 2004

From Control to Design: Parametric/Algorithmic Architecture, Michael Meredith, Actar Publishing, New York, 2008

Manufacturing Material Effects, Branko Kolarevic and Kevin Klinger, Everbest Printing Co., China, 2008

Arch 3690

Intermediate Computation and Fabrication

Tue. 11:30 pm - 1:30 pm | Fri. 11:30pm - 1:30pm

Prof. Joseph Vidich (jvidich@citytech.cuny.edu)

Prof. Charlie Able (cable@citytech.cuny.edu)

Department of Architectural Technology
New York City College of Technology
City University of New York
300 Jay Street, Brooklyn, New York 11201

LEARNING OBJECTIVES:

Upon completion of the course, students should be able to

1. Demonstrate an advanced understanding of digital tools and how they can be applied to solve architectural digital fabrication problems.
2. Demonstrate intermediate / advanced knowledge of parametric software (Grasshopper, Solidworks), including solid modeling, polygons and mesh techniques, and a fundamental knowledge of coding
3. Demonstrate ease in carrying out iterative workflows across multiple software platforms including modeling, parametric functionality, and analysis
4. Demonstrate proficiency in detailing, assembly and digital tectonics
5. Illustrate proficient knowledge of mill set up, basic machine maintenance, and safety procedures
6. Display proficiency in best practices for 3D modeling for laser cutter operation through surface
7. Illustrate an understanding of precedents of digital fabrication in other industries [ie. ship building, automotive industry, industrial design]
8. Carry out production/assembly of small-scale prototype(s)
9. Demonstrate flattening/building and contouring, and in operating laser cutters
10. Demonstrate knowledge for creating profiling, drilling, and surfaces modeling drawings for use with a CNC mill. Show applied understanding of mill software interfaces (RhinoCAM and MadCAM, etc.)
11. Combine manual fabrication techniques (such as heat bending and component assembly) with digital fabrication techniques

	SUN	MON	TUE	WED	THU	FRI	SAT
AUG				28 1ST DAY CITYTECH	29	30 CLASS INTRO / INTRO TO PLEXI SPHERE PLEXI SPHERE DESIGN	31
	01	02 LABOR DAY NO CLASS	03 3D MODEL DUE / DESK CRITS PLEXI SPHERE PROTOTYPE	04 NO CLASS / NO MILLING HRS	05 NO CLASS / NO MILLING HRS	06 NO CLASS / NO MILLING HRS	07
	08 NO MILLING HRS	09	10 PAPER PROTOTYPE DUE/ DESK CRITS PLEXI SPHERE PROTOTYPE	11	12	13 NO CLASS / NO MILLING HRS	14 NO MILLING HRS
SEP	15 NO MILLING HRS	16	17 PLEXI PROTOTYPE DUE / DESK CRITS PLEXI SPHERE FINAL	18	19	20 PLEXI PROTOTYPE REVISIONS / DESK CRITS PLEXI SPHERE FINAL	21
	22 NO MILLING HRS	23	24 PLEXI PROTOTYPE REVISIONS / DESK CRITS PLEXI SPHERE FINAL	25	26	27 PLEXI SPHERE REVIEW / INTRO TO FACADE PROJECT HEAT BENDING / TECH. TESTS	28
	29 NO MILLING HRS	30	01 SHOW & TELL / RHINOCAM 2.5-AXIS MILLING TECH COMPONENT AND TECH. PROTOTYPING	02	03	04 SHOW & TELL / PLEX MILLING DEMO COMPONENT AND TECH. PROTOTYPING	05
OCT	06 NO MILLING HRS	07	08 SHOW & TELL / RHINOCAM 2.5-AXIS MILLING TECH COMPONENT AND TECH. PROTOTYPING	09	10	11 ASSIGNMENT 02 MATERIAL EXPLORA- TIONS DUE FACADE DESIGN / PRECEDENTS	12
	13 COLLEGE CLOSED / NO MILLING HRS	14 NO CLASS NO MILLING HRS	15 NO CLASS MONDAY SCHEDULE	16	17	18 FACADE SYSTEMS / GRSHPR FACADE DESIGN	19
	20 NO MILLING HRS	21	22 SLDWKRS INTRO / DESK CRITS FACADE DESIGN	23	24	25 FACADE SYSTEMS / GRSHPR / DESK CRITS FACADE DESIGN	26
NOV	27 NO MILLING HRS	28	29 SLDWKRS / IN CLASS DEMO FACADE DESIGN / PROTOTYPE	30	31 Mid-semester evaluation ends. Rosters due. WEBGrade closes.	01 FACADE SYSTEMS / GRSHPR / DESK CRITS FACADE DESIGN / PROTOTYPE	02
	03 NO MILLING HRS	04	05 DESK CRITS FACADE DESIGN / PROTOTYPE	06	07 Last day to withdraw with W grade.	08 ASSIGNMENT 03a PROTOTYPE REVIEW FACADE DESIGN	09
	10 NO MILLING HRS	11	12 DESK CRITS FACADE DESIGN / PROTOTYPE	13	14	15 DESK CRITS FACADE DESIGN / PROTOTYPE	16
DEC	17 NO MILLING HRS	18	19 DESK CRITS FACADE DESIGN / PROTOTYPE	20	21	22 DESK CRITS FINAL FABRICATION	23
	24 NO MILLING HRS	25	26 DESK CRITS FINAL FABRICATION	27 DESK CRITS / INCLASS MILLING DAY FINAL FABRICATION	28 THANKSGIVING NO CLASS / NO MILLING HRS	29 NO CLASS / NO MILLING HRS	30 COLLEGE CLOSED / NO MILLING HRS
	01 COLLEGE CLOSED / NO MILLING HRS	02	03 DESK CRITS / INCLASS MILLING DAY FACADE DESIGN / PROTOTYPE	04	05	06 FULL MOCK-UP DUE FINAL ASSEMBLY	07
DEC	08 NO MILLING HRS	09	10 DESK CRITS / INCLASS WORKING DAY FINAL ASSEMBLY / FINISHING	11	12	13 DESK CRITS / INCLASS WORKING DAY FINAL ASSEMBLY / FINISHING	14
	15 NO MILLING HRS	16	17 DESK CRITS / INCLASS WORKING DAY FINAL ASSEMBLY / FINISHING	18	19	20 FINAL REVIEW	

ASSIGNMENT 01 GLUELESS PLEXI SPHERE

FINALIZATION AND ASSEMBLY
OF SPHERE PIECES

ASSIGNMENT 02 PLEXI MATERIAL EXPLORATION

ASSIGNMENT 03a DESIGN AND DEVELOPMENT OF PLEXI PANEL COMPONENTS (BEGIN GROUP WORK)

FINALIZATION OF
INSTALLATION PROTOTYPE

ASSIGNMENT 03b DEVELOPMENT AND FABRICATION OF PLEXI PANEL COMPONENTS

FINALIZATION OF
INSTALLATION PIECES