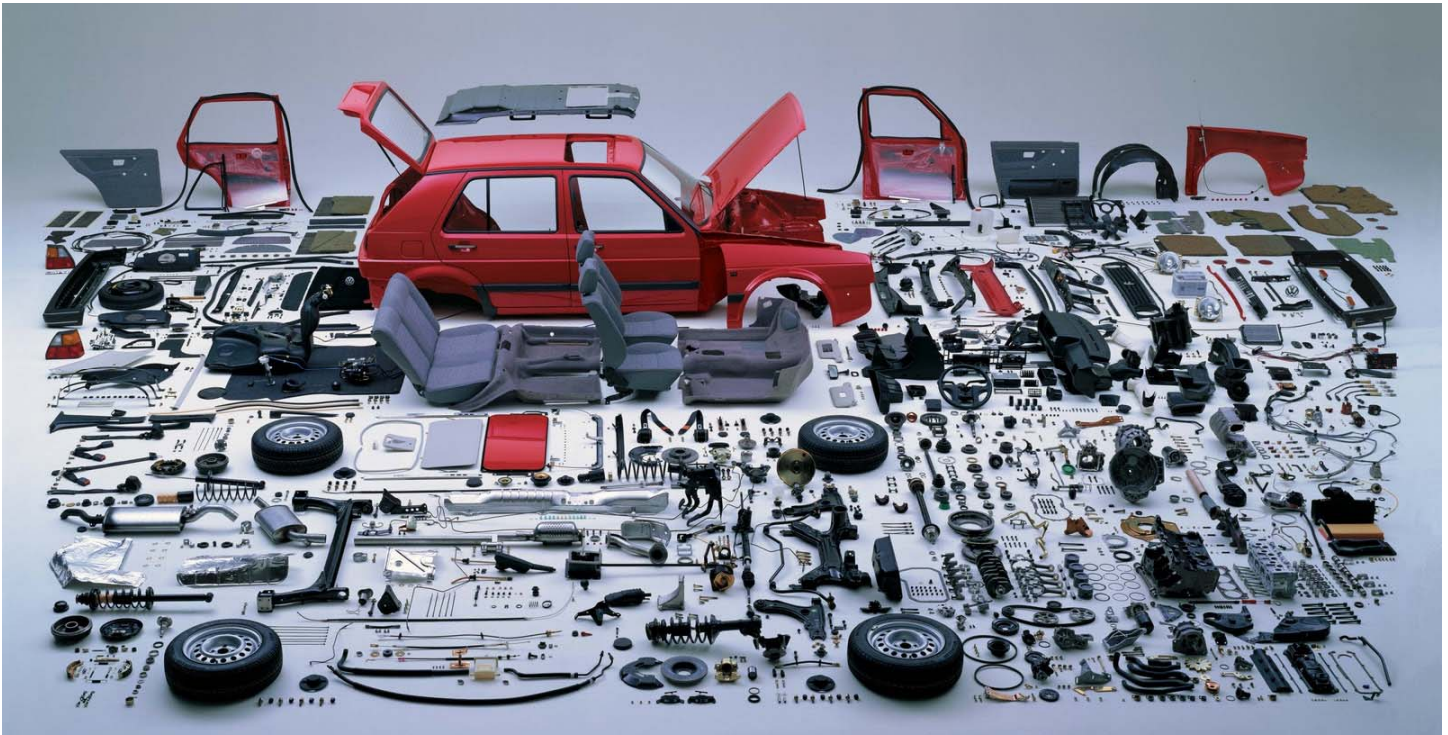


# ARCHITECTURAL ASSEMBLIES

## MIT 4.123 LECTURE - ARCHITECTURE + URBANISM

Instructor(s): Marc Simmons Marc, msimmons@frontinc.com  
John Klein, j\_klein@mit.edu  
TA(s): John Christopher Fechtel, fechtel@mit.edu  
Paul Luis Short, pshort@mit.edu  
Credits: 3-0-6 G  
Schedule: F 9am-12pm  
Location: 3-133

### COURSE DESCRIPTION



Volkswagen Golf product catalogue

*Architectural Assemblies*, is a framework geared towards the development of innovative architectural systems, with a specific focus on the building envelope.

An overview of materials, processing methods, and their formation into building systems across cultures will be provided through in-depth lectures of notable built works. Normative and advanced design-delivery techniques will be examined through projects utilizing conventional documentation, Building Information Modelling (BIM) and Building Information Generation (BIG), coupled with automation pipelines and file-to-factory processes. A holistic understanding of the architectural-building cycle enables participants to build upon the recent history of design and construction to make informed decisions towards developing innovative building systems.

## EXERCISES



*Morphosis mock-up model (Exercise 01 reference) + Peter Zumthor Bregenz multi-story façade model (Exercise 02 reference)*

Students will organize into groups of 4-5 and select a case study from the list below. Each group will then research the case study building, program, organizational logic, material and construction systems, tectonics, site, context and subgrade conditions.

Each group should assess the best tool set and process logic for digital modeling of the building. Deliverables include required representation of the building as both live model, slide presentation and choreographed animation, including surface, wireframe, system and constructability representation, and detailed tectonics of a key multi material systems interface. Foundations, site, structure, conceptual map, interior systems and detailed building envelope shall all be modeled.

Physical modeling at scale TBD of a meaningful, representative part of the building envelope and related structure and mep systems.

List of possible Front buildings that can be used for case studies. Selected projects will be included in the case study sequence and slide decks will be made available to the teams. Supplemental project documentation may be provided after teams conduct comprehensive building research from public sources.

### FRONT CASE STUDY SELECTION

Seattle Library	OMA + LMN Architects
CCTV	OMA + ECADI
Wyly Theater	REX / OMA + Kendall Heaton Associates
Stavros Niarchos Foundation Cultural Center	Renzo Piano Building Workshop + Betaplan
Amazon Spheres	NBBJ Architects
Grace Farms	SANAA + Handel Architects
Perez Art Museum	Herzog de Meuron + Handel Architects
Kimbell Art Museum Addition	Renzo Piano Building Workshop + Kendall Heaton Associates
Guardian Art Center	Buro Ole Scheeren + BIAD
MahaNakhon	Buro Ole Scheeren + OMA + PT Architects
Shenzhen Energy Building	BIG + SADI
Yas Island Viceroy Hotel	Asymptote + Dewan
Toledo Museum	SANAA + Kendall Heaton Associates
Vakko	REX
Morgan Library and Museum	RPBW + Beyer Blinder Belle
Duke Student Union	Grimshaw Architects
Via Verde	Grimshaw Architects + Dattner
100 11th Avenue	Ateliers Jean Nouvel + Beyer Blinder Belle
Barclays Arena	Aecom + Shop Architects

## SCHEDULE

Week 01	Feb.09	Course Overview Lecture 01: <b>Introduction, Aesthetics, design language and process innovation</b> Introduce Exercise 01 / Select Case Studies
Week 02	Feb.16	Lecture 02: <b>CS - Arts Facilities / Visual Performing Arts / Education</b>
Week 03	Feb.23	Lecture 03: <b>System Typologies and Taxonomies</b>
Week 04	Mar.2	Lecture 04: <b>CS - Towers and Mid Rise Office, Residential, Hotel, Amenities</b>
Week 05	Mar.9	Lecture 05: <b>Performance, Durability, LCA, Standards, Life Safety, Cleaning, Maintenance</b>
Week 06	Mar.16	Lecture 06: <b>CS - Institutional / Cultural / Religious Libraries, Courthouses, Civic, Stadium</b>
Week 07	Mar.23	Lecture 07: <b>Analysis Methods, Tools, Structure, Serviceability, Energy, Security, Failsafe</b>
Week 08	Mar.30	No class - spring break
Week 09	Apr.06	Lecture 08: <b>CS - Villa Residential</b>
Week 10	Apr.13	Lecture 09: <b>BIM, BIG, Documentation, Fabrication Data, Assembly Data</b>
Week 11	Apr.20	Lecture 10: <b>CS - Retail, Pavilions, Kiosks, Staircases</b>
Week 12	Apr.27	Lecture 11: <b>Materials, Systems, Components, Processing, Manufacture and Assembly</b>
Week 13	May.04	Lecture 12: <b>CS - Adaptive Reuse Reclad, Insertion, Penetration, Extension, Addition</b>
Week 14	May.11	Lecture 13: <b>Procurement, Cost-schedule, Means, Methods, Implementation, Post Completion</b>
	May 18	<b>Exercise 02B Review + Exhibition</b>

## REFERENCES

### Reference Books

Facade Construction Manual - Thomas Herzog

Exterior Building Enclosures - Keith Boswell

Structural Glass Facades - Mic Patterson

Cladding of Buildings - Alan J. Brookes

Building Construction Illustrated - Ching

Fundamentals of Building Construction - Allen + Iano

Materials and the Environment – Michael Ashby

Building Skins – in Detail

Mechanical and Electrical Equipment for Buildings (MEEB) Twelfth Edition – Grondzik + Kwok