CAN WE CONSTRUCT A CHANGE?

INSTRUCTOR
ZHU Jingxiang
zhujx@cuhk.edu.hk

ASSISTANT
NAN Tian

DESCRIPTION

Evolution
"In the long history of humankind (and animal kind, too) those who learned to collaborate and improvise most effectively have prevailed." This sentence from Charles Darwin is suitable to describe those forces advancing the construction industry that was very old but has been evolving steadily.

Element
An ancient building can be seen as a huge mass constructed from blocks and/or rods. Stacking was the most primitive and basic method. The framing later brought improvements in construction efficiency. However, panels were used more and more, from wall to floor, from door to curtain wall. The flat plate defined a room, positioned openings, and guided the movement. The panel even shaped the city's skyline and horizon through its very unique loadbearing mechanism. Innovators have developed various flat panel materials by using wood, steel, glass and concrete since the Industrial Revolution. Without these affordable flat panels, the modern city, internationalism architectural and furniture revolution in the 20th century will be very unimaginable. In the past three decades, the advanced construction systems relying on panels have become a hot spot attracting investment in developed industrial countries.

Panelized
Panelized means made of or having prefabricated wall, floor, and roof sections that are shipped to and assembled at the building site. Panelized also means a construction can be conceived from the functional logic of panel: the spatial perception, the load-bearing mechanism, and the ease of assemblage. A panel can affect the space with a non-planar form. An ultra thin panel will not only make the experience of traveling through spaces extraordinary, also the usage efficiency will be greatly different. When the load bearing mechanism of a panel can be applied on a frame form made of rods, strength, lightness and light effect can be achieved simultaneously. The physical properties of a panel may vary greatly and the new form may emerge when the internal structure of the panel can be examined and altered.

Inspiration
The inspiration of system design comes from two directions: an understanding of history, and a careful reflection on operation and its result. Since obtaining panel-like materials from Mother Nature was not easy at all, so what inventions in history have shaped panels and their applications? How does the jointing and combining of the panels benefit from the framing and stacking operation? Which operations may reshape the form of a panel? Which operation may strengthen the structure, and which enriches the perception?

System
In cope with a construction system, a design has to articulate various issues, such as supply, production, transportation and connection. A success will bring advantage on convenience and economy, by transferring construction work to factories, thereby reducing the difficulty of on-situ construction.

Empowerment
The novel construction system will bring various opportunities with competitive advantages, empower commercial and social groups, change communities, and even reshape the construction industry. This studio is dedicated to exploring this potential from a multi-dimensional perspective.

PROCESS

Flow
The first semester consists of a series of topic-focused exercises, led by the professor and his research team, and each topic includes a dedicated study.
The second semester connecting with design tasks that comprehensively use topic knowledge will be led by the students. The semester will clarify a concept of construction that articulates other issues, and eventually produce high-resolution design proposals.

(Term 1)
1. Theme A: Stacking and framing
2. Theme B: Panelizing
3. Theme C: Construction as system
4. Theme D: Ground limit
5. C + D : Construction adaptive to the ground
6. Theme E: Envelope
7. C+D+E : Shelter on the ground

(Term 2)
8. Theme F: Program
9. C + F : Construct for program
10. Theme G: Campus
11. A+B+C+D+E+F+G: Integrate for Construction
12. Project that make a difference

Two situations will lead to minor adjustments in the above stages: the epidemic situation and the arrangement of public critic and consultancy.

Topic
The topics define the purpose of the research and keep the exercise focused. It is the responsibility of the individuals and groups to accumulate, interpret and clarify each category.

CONSTRUCTION
Stacking, Framing, Panelizing
GROUND
Topography, settlement, Foundation
ENVELOPE
Wall, Cladding, Shell
PROGRAM
Function, Program, Essence

Grouping
Studio brings the possibility of learning from peers. The group organisation follows the possibility brought by number twelve. It allows one, two, three, four, and six to divide the group. Case study exercises are suitable for small groups, and construction activities will undoubtedly require more people.

Philosophy
Heterotopia, a concept elaborated by philosopher Michel Foucault, describe certain cultural, institutional and discursive spaces that are somehow 'other'. The concept of heterotopia has had a significant impact on literature and art creations. "Project that make a difference" will discuss the issue and work toward this direction.

Software
BIM software: ArchiCAD, ArchiFrame
Scripting software: Rhino, Grasshopper
Simulation software: Ameba, CFD
Software teaching will be collaborating with the studio led by Prof. WANG Zhenfei.

DELIVERABLES

Each theme is designed as an academic exploration on architectural issue/s. All exercises will be in portrait format. A total A2x20 panels for Semester 1. In the second semester we will find design solutions. During the second semester students will produce A2x20, hence for the whole project will comprise of A2x40 panels.

Stacking and framing
Physical catalytic model for operation study.
A2x2 Black and white photograph matrix format

Panelizing
Physical catalytic model for operation study.
A2x2 Black and white photograph matrix format

Construction as system
Unit model and Repetitive model
A2x2
Set of drawing and images describing the system

Ground limit
Site Model for final design
A2x2
Set of drawing and images describing plot

Construction adaptive to the ground
Model
A2x2 panels
Set of drawing and images describing proposal

Envelope
Case Study Model
A2x4 panels
Set of drawing and images describing types

Shelter on the Ground
Scale models
A2x6 panels
Set of drawing and images describing proposal

Program
A2x2 panels
Set of drawing and images describing program

Construct for program
Catalytic Model
Technical report A3x 30 pages

Campus
Site model
A2x2 panels
Set of drawing and images describing site challenges and design options

Integrate for Construction
Key unit and partial model
A2x2 panels
Set of drawing and images describing primary concept relating to space and making.

Project that make a difference
Experimental and scale models
A2x6 Photos of models
Set of drawing and images describing journey.

Final Presentation
A2x8 panels
Master plan, Plans, Sections, Elevations, Axonometric, Model and views

Process Portfolio

Process Report A3x 30 pages
Evolution of the project

LEARNING OUTCOME

1. Ability to create architectural designs that satisfy both aesthetic and technical requirements.
2. Adequate knowledge of the histories and theories of architecture and the related arts, technologies and human sciences.
3. Knowledge of the fine arts as an influence on the quality of architectural design.
4. Understanding of the relationship between people and buildings, and between buildings and their environment, and the need to relate buildings and the spaces between them to human needs and scal
5. Understanding of the methods of investigation and preparation of the brief for a design project.
6. Ability to generate complex design proposals showing understanding of current architectural issues, originality in the application of subject knowledge and, where appropriate, to test new hypotheses and speculations.
7. Ability to evaluate and apply a comprehensive range of visual, oral and written media to test, analyse, critically appraise and explain design proposals.
8. Awareness of the theories and methods of inquiry that seek to show the relationship between human behaviour and the physical environment.
9. Understanding of the basic principles of sustainable development and architects' responsibilities with respect to the social, economic and environmental sustainability in architecture and urban design.
10. Understanding of the principles of structural behaviour in withstanding gravity and lateral forces, and the range and appropriate applications of contemporary structural system.
11. Ability to assemble a comprehensive programme for an architecture project, including:
12. Ability to respond to natural and built site characteristics in the development of a programme and design of a project.
13. Ability to work cooperatively with others in a team setting. Ability to discuss architectural ideas with non-architects, to listen objectively to their opinions and to consider those opinions in designing.
14. Ability to speak and write effectively on subject matters contained in the professional curriculum in English.
15. Ability to use appropriate representational media, such as drawings, models, diagrams, charts, including computer technology, to convey essential design information at each stage of the programming and design process.

ASSESSMENT SCHEME

1_Midterm Reviews (30%)

1. Midterm Review 1, October (10%)
2. Midterm Review 2, December (10%)
3. Midterm Review 3, March (10%)

2_Final Review (50%)

1. Final Project Presentation, May (50%)

3_Project Book (20%)

1. Project Book to have three parts: Position/ Technology / Process
2. To be started at the beginning of the year and reviewed throughout.

COURSE FORMAT

1_Group Work

1. Students are allowed to work in groups only the first semester.
2. The second semester will be all individual projects.

2_Teaching Days

1. The Design Studio will be taught two days a week Monday and Thursday 13:30 to 18:00

3_Studio Spaces

1. Each Studio will have their own space, accommodating a desk for each student
2. Layouts will be issued at the start of the academic year

FIELD TRIP

At present all foreign trips are suspended until further notice. If the COVID-19 situation improves, the school will inform the Design Studio tutors.

REQUIRED READINGS

Deplazes, Andrea, et al. *Constructing Architecture: Materials, Processes, Structures: a Handbook*. Third, extended ed., Birkhäuser Verlag, 2013.

Kolb, Josef, et al. *Systems in Timber Engineering*. Walter De Gruyter GmbH, 2008.

Miralles, E. *Enric Miralles, 1983-2000*. El Croquis Editorial, 2006.

Puente, Moises, et al. *2G: Ensamble Studio: Issue #82*. Konig, Walther, Buchhandlung, GmbH & Company KG. Abt. Verlag, 2021.

Kuma, Kengo, et al. *Kengo Kuma: Complete Works*. Thames & Hudson Inc., 2013.

Sejima, Kazuyo, et al. *Kazuyo Sejima + Ryue Nishizawa, 1983-2000*. El Croquis Editorial, 2001.

Atelier Archmixing (阿科米星). *Atelier Archmixing阿科米星: 2009-2019*. Tongji University Press 同济大学出版社, 2020.

大舍建筑. 大舍：即物即境. UED 城市环境设计, 2016.

IMPORTANT NOTE TO STUDENTS

Attendance

Class attendance is required in all courses. For an excused absence, the instructor must be notified and presented with documentation of illness or personal matter. Please note: **Three (3)** or more unexcused absences may result in a failing grade for the course.

Academic Honesty

Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations. Details may be found at: http://www.cuhk.edu.hk/policy/academichonesty/. With each assignment, students may be required to submit a statement that they are aware of these policies, regulations, guidelines and procedures.

Student Work
Submission of studio documentation must be complete and correctly formatted. Missing or incomplete submission of the documentation folder will result in the grade for the course being withheld. This will prevent registration for the following term or delay graduation. In addition, a grade deduction of *one letter grade* will be made.

SCHEDULE

Important Dates

SEMESTER 1
1_Midterm Reviews (30%)
Midterm Review 1, 25-29 October 2021 (10%)
Midterm Review 2, 06-10 December 2021(10%)

SEMESTER 2
Midterm Review 3, 01-04 March 2022 (10%)

2_Final Review (50%)
Final Project Presentation, 03-06 May 2022 (50%)

3_Project Book (20%)
Project Book to have three parts: Position/ Technology / Process, 13 May 2022 (20%)

Term 1: 6 September 2021 (Mon) – 4 December 2021 (Sat)

	WEEK 01	
06.09	**INTRODUCTION**	**STUDIO SELECTION**
09.09	Theme and schedule	Results Announced

	WEEK 02	
13.09	Stacking 01	Theme introduction
16.09	Stacking 02	Development

	WEEK 03	
20.09	Framing 01	Theme introduction
23.09	Framing 02	Development

	WEEK 04	
27.09	Panelizing 01	Theme introduction
30.09	Panelizing 02	Development

	WEEK 05	
04.10	Panelizing 03	Development
07.10	Construction as system 01	Theme introduction

	WEEK 06	
11.10	Construction as system 02	Development
14.10		Chung Yeung Festival

	WEEK 07	
18.10	Construction as system 03	Development
21.10	Construction as system 04	Articulation

	WEEK 08	
25.10 – 29. 10		**MIDTERM REVIEW 1 (10%)**
	Ground Limit	Theme introduction

	WEEK 09	
01.11	Construction adaptive to the ground 01	Development
04.11	Construction adaptive to the ground 02	Development

	WEEK 10	
08.11	Envelope 01	Theme Intorduction
11.11	Envelope 02	Development

	WEEK 11	
15.11	Envelope 03	Development
18.11	Envelope 04	Development

	WEEK 12	
22.11	Shelter on the ground 01	Theme Intorduction
25.11	Shelter on the ground 02	Development

	WEEK 13	
29.11	Shelter on the ground 03	Development
02.12	Shelter on the ground 04	Development

	WEEK 14	
06.12 – 10.12		**MIDTERM REVIEW 2 (10%)**

Term 2: 10 January 2022 (Mon) – 23 April 2022 (Sat)

	WEEK 15 (2022)	
10.01	Program 01	Theme
13.01	Program 02	Development

	WEEK 16	
17.01	Program 03	Development
20.01	Program 04	Development

	WEEK 17	
24.01	Construction for Program 01	Theme
27.01	Construction for Program 02	Development

	WEEK 18	
31.01 – 05.02		**Lunar New Year Vacation**

	WEEK 19	
07.02	Construction for Program 03	Development
10.02	Construction for Program 04	Development

	WEEK 20	
14.02	Campus 01	Theme
17.02	Campus 02	Theme

	WEEK 21	
21.02	Integration 01	Theme
24.02	Integration 02	Development

	WEEK 22	
01.03 – 04.03		**MIDTERM REVIEW 3 (10%)**

	WEEK 23	
07.03	Integration 03	Development
10.03	Integration 04	Development

	WEEK 24	
14.03	Integration 05	Development
17.03	Integration 06	Development

	WEEK 25	
21.03	Integration 07	Development
24.03	Integration 08	Development

	WEEK 26	
28.03	Integration 09	Development
31.03	Integration 10	Development

	WEEK 27	
04.04	Project that make a difference 01	Theme
07.04	Project that make a difference 02	Development

	WEEK 28	
11.04	Project that make a difference 03	Development
14.04	Project that make a difference 04	Development

	WEEK 29	
18.04		**Easter Monday**

	WEEK 30	
25.04	Project that make a difference 05	Development
28.04	Project that make a difference 06	Development

	WEEK 31	
02.05		**The day following Labour Day**
03.05- 06.05		**FINAL REVIEW (50%)**

	WEEK 32	
09.05		
13.05		**PROJECT BOOK (20%)**
		Project Book to have three parts: Position/ Technology / Process