# CIEE in Barcelona, Spain

**Course name:** Future Cities Design Studio
**Course number:** ARCH 3001 BASP
**Programs offering course:** Barcelona Global Architecture and Design
**Language of instruction:** English
**U.S. Semester Credits:** 6
**Contact Hours:** 90
**Term:** Spring 2019

## Course Description

Continuing the IAAC research agenda, and using Barcelona as an experimentation laboratory, this studio will explore the relationship between city and water (common topic of all three Global AD cities), seeking innovative ways to improve this connection through speculative design and experimentation. Challenged with the necessity for self-sufficient public space and infrastructure of future cities, we will propose a unique typology and technological intervention that can have profound impact not only on local surrounding, but can be applied on any context with similar issues. The chief directives will be the shrewd intersection between technology and environment, especially under the rubric of ecology and computational design.

**Metabolic waterscapes**

Barcelona underwent one of the deepest and most evident urban transformations of its history for the 1992 Olympic Games. The "Barcelona Model" was born as a paradigm for contemporary public space and exported worldwide. Beneath this recognized urban icon, there was a foundation of well-managed private and public agencies allowing and catalyzing the changes in all social and economic behaviors. Twenty years later, the challenges are how to incorporate new micro and macro infrastructures in an apparently finished city: the cruise ships harbor and the new sea- tourism; the old and new airport in relation with low- cost air companies; the new highway tunnels through Colserolla mountain; the new underground lines and the future Sagrera train station, or the state of transformation of both limiting rivers, the Llobregat at the South West limit and the Besos at the North East. These two rivers provided the infrastructure for the development of industries, while offering connectivity between the coast to the interior areas of Catalunya. With the expansion of the old city, the Besos river is now packed with heavy mobility infrastructure, developing severe problems of pollution, dysconnectivity, segregation, resulting in cultural, social, programmatic and infrastructural isolation for its adjacent communities.

A recent intervention along the Besos Rivers was implemented to restore depleted natural habitats, proposing wetlands to purify heavily polluted water, developing a variety of recreational uses along the river. Despite these positive changes, the Besos River remains heavily disconnected with the adjacent areas along its borders. This problem becomes critical in the area where the river meets the ocean, presenting a challenging

difficulty of integration with the variety of public spaces along the 14km waterfront developed during the 1992 Olympic games. In addition, the integration of restored natural habitats needs to be addressed when meeting one of the largest Purification plants in Barcelona located underneath the adjacent Forum of Cultures built in 2004. In light of these problems, Barcelona Regional, the Public Agency in charge of future developments for the Barcelona Metropolitan Areas, is currently requesting architects, urban planners, academic institutions and economic agents to be proactive in defining and proposing possible sustainable future for the river Besos final section at the Mediterranean Sea. Our testing site will be located at this strategic intersection, and we will use the opportunity and join the list of current proposals with a set of new ideas with potential to establish bold connections between the water and these urban public spaces. The future of this river poses important questions for the transformation difficulties of a metropolitan city of Barcelona, that must actively replace old infrastructure, renew its resources, invigorate its public spaces, and address pressing environmental concerns, such as the relationship between city and water.

The Spring 2014 Global AD Studio explored the notion of "Living Infrastructures" along the Besos River and the Mediterranean Sea. This fall, we will explore the notion of "**Water Metabolisms**" to actively incorporate/ invigorate / revitalize/ stimulate / animate / implement self-sufficient strategies linked to public spaces designed to accommodate new festival and ephemeral grounds.

**The Program and Site**

Barcelona is one of the world capitals of culture and leisure, offering a variety of iconic music festivals such as the Sonar, Primavera Sound, Barcelona Beach Festival, along with numerous concerts, and a variety of local festivities throughout the year. These events attract local community as well as foreign tourists to various locations within the cityscape, especially along the waterfront, which has become increasingly associated with recreational uses of the city. Festivals are also becoming major contributors to local and global economy as they have the ability to revitalize specific urban context and internationally promote the city as a rich-program destination. The organizations of these cultural events however, often come with two challenges. First, they are short-term and as such create positive, but still temporary effect on urban space, and second they are supported by massive infrastructure which have to meet requirements of specific program. Whilst we wont change the nature of festivals per se, we will question the current typology of festival infrastructure (i.g. stages, pavilions etc) and explore the possibility of reusable structures that can serve different purpose throughout the year and physically transform into festival ground when event date approaches. With the latest breakthrough in technology and materiality, we shall test various structures that are generating direct or indirect relation between water and ground, public and private space, large or small scale function, single or multiple components, aggregation vs. scattering.

**Program:**

The suggested program is a description of project components and area, which must be considered as a guide. Each group must adapt these elements to suit their particular proposals.

**Pedestrian Bridge / connector**

The new waterfront condition is concerned with the intersections of urban and ecological services and provisions and public accessibility. Critical is the resolution of the river crossing at the seafront edge, where a continuous surface must ensure the continuity of the waterfront, connecting into Badalona and the northern coastal area of Barcelona.

**Waterfront: 10000 m²**

Waterfront intervention includes park space, cycling and walking paths, recreation, nutrient containment/management infrastructure and wetlands. There should be a strong connection between waterfront and pavilion morphology.

- Cafe: 1000 m²
- Offices: 100 m²
- Restaurant: 500 m²
- Platform/Docks: 400m²
- Landscape Conditions: +/-10000m²
- Promenade cycling and walking pathways, wetlands, beaches, etc.

**Pavilion(s): 4000 m²**
A partially enclosed iconic shell houses events, performances, and public space (when not in use for specific events). The pavilion is intended as a driver for development along the waterfront that encourages shared public, private, and commercial uses. The pavilion program can be housed in a single structure or dispersed in other locations along the area. It should be flexible for multiple uses, and publicly accessible.

**Core Event/Performance Space: 1000 m²**
The core section of the pavilion includes stage and spectator space and can be closed for wintertime uses. When opened, it should be integrated with the larger pavilion park space.

**Facilities Management Offices: 500 m²**
Studios will house arts/cultural organizations and ateliers, which benefit from and encourage public use of the pavilion and river. These spaces should be adaptable for multiple uses. Close proximity to core event space

- **Equipment Storage: 500 m²**. In close proximity to core event space
- **Studios/Offices: 500 m²**
- **Additional Public/Event Space: 1000 m² +**
- **Charging Station: 500 m2.** *E-Car charging and stackable/hanging parking for 100 cars*

## Learning Objectives

- Students will be able to critically communicate ideas about cities and environment.
- Students should be able to begin to understand the practice of architecture and design within an emerging global context.
- Students will be able to conduct urban investigations and present their findings coherently in verbal and graphic formats.
- Students should be able to respond to site characteristics in a meaningful way.
- Students should be able to critically communicate architectural and urban design ideas.
- Students should be able to learn from relevant urban precedents.
- Students should be able to develop a comprehensive project, in other words, be able to tell a complete story using a range of media.
- Students should have a rudimentary understanding of the phenomenon of building at all scales; from component details to city scale.
- Students should begin to understand the relationship of architecture and design to allied disciplines; they should be able to work in interdisciplinary teams.
- Students will be able to work productively in a group.
- Students should be able to design projects that optimize, conserve, or reuse natural and built resources, provide healthful environments for occupants/users, and reduce the environmental impacts of the build environment on future generations through means such as carbon neutral design, bioclimatic design, and energy efficiency.
- A multiscalar, and multi-site approach will be utilized to explore how the agenda unfolds with the particular economic, biological, and social factors of each area.
- At the urban scale, we will imagine how a city could evolve under different forces
- At the detail scale we will reconstruct a 'smart city prototype,' capable of producing and mitigating its production to and from the city.
- At the tectonic scale we will explore deployable systems (and wearable technology?)
- The studio seeks to generate a series of fabricated prototypes, addressing the agenda through multiple scales.

## Course Prerequisites

None.

## Methods of Instruction

In class lectures, group discussions, desk critics, and site visits. There will be strong coordination between the studio and the seminar for theoretical and urban concepts, as well as with the technology workshop for practical skills.

## Assessment and Final Grade

Students shall be evaluated according to the following:
- Demonstration of imaginative and critical thinking skills.
- Clarity, precision of argument, creativity and depth.
- Development of a project that is appropriate to the criteria developed in class and that of the discipline of architecture, design and engineering.
- Demonstration of technical knowledge essential to the making of architecture.
- Ability to communicate intentions verbally and graphically.
- Understanding of cultural, architectural, technical, and historical ramifications of projects.
- Conscientious effort over the course of the entire quarter.
- Completion of all requirements in a timely manner.
- Participation in individual and group reviews.

1. Participation in Class: 20%
2. Midterm Presentation, a public presentation (in a variety of possible media) will investigate alternative site solutions. 40%
3. Final Presentation and Exhibition, students will prepare a studio portfolio and an exhibition in which their understanding of the design process will be demonstrated: 40%

## Course Requirements

### Submission

The protocol for assignments due throughout the term will be using the IAAC CLOUD. Faculty will provide specific instructions for each assignment.

### Publication:

Each group will produce and E-Book to document each proposal from schematic design to project completion.

### Calendar

The term is divided into phases. Each stage is completed with specific tasks and deliverables, when students will present results to the group and receive faculty feedback.

| | |
|---|---|
| 01: Design Exercise | 1 Week |
| 02: Site/Environmental Analysis | 3 Weeks |
| 03: Conceptual Design: | 2 Weeks |
| 04: Design Development: | 3 Weeks |
| 05: Design Refinement: | 3 Weeks |
| 06: Communication/Presentation/Publishing: | 3 Weeks |
| Total: | 15 weeks |

**Attendance Policy**

Students are expected to attend all scheduled class sessions on time and prepared for the day's class activities. CIEE does not distinguish between justified or unjustified absences, whether due to sickness, personal emergency, inevitable transport delay and/or other impediments. You are considered responsible of managing your own absences. Please keep in mind that exams, paper submission dates, presentations and any other course work deadlines cannot be changed.

No academic penalty will be applied if students miss up to 3 class sessions. If students miss up to 5 class sessions, students' final course grade will drop 5 points out of 100 on the CIEE grade scale for each additional absence beyond 3 (for example a 95 will become a 90 if they reach the 4th absence, and an 85 if they reach the 5th absence). **Students will automatically fail the course if they miss more than 20% of total class hours (i.e. if they exceed 5 absences).**

For students who miss up to 20% of the total course hours due to extenuating circumstances, the Academic Director may allow for exceptions to the local attendance policy based on documentation such as proof of bereavement, religious observances, hospitalization etc.

Students arriving more than 10 minutes late to the class will be considered absent for a day.

**Weekly Schedule**

The students will start working individually and later in teams of 2 people. The schedule will be divided into multiple segments with lectures, desk-crits, tutorials, and specific deliverables.
Note: This schedule may be subject to changes.

**Session 1**

**Welcome, Intro Lecture, Design Exercise.**
Faculty Intro, Course Syllabus, Calendar, Readings, Group Organization, Sharing info (Iaac Cloud/Visiting Programs);
Form finding design exercise "**Soap Film Formations**"
**Due Exercise #1: "Soap Film Formations" (in groups of 2);**
Task: Generate several formations given 5 strategies (Extrusion, Loops, Agglomerations, Catenaries, and Platonic Solids).
Document formations
Extract logics

**Session 2**

**Intro:**

Opening Lecture by Maria Aialova
Presentations of Exercise #1
**Task: Presentation of Group #1**

**Session 3**

**Site/Environmental Analysis: Site Visit, Analysis.**
Lecture: "Barcelona Model"
Tasks: Intro Studio, Site Analysis Tasks, Group Definition, Define
Research Topics, Prep Info

**Session 4**

**Site/Environmental Analysis**
Site delimitation from the West to the East side of Besós River
meeting the Mediterranean
Lecture: Site Intro by BR Team (Consorcio Besos) by Joan Sans

(architect).

Site Investigation, Data Collection, Mapping & Diagnosis

**Session 5**

**Site/Environmental Analysis**
Site visit & documentation by groups.
Free format: Photographs, Videos, Samples (sound, matter, tests);
Interviews, Advertisement, Real Time Data, sketches, diagrams,
etc.
**Exercise # 2: Collect site info & data collection strategy**
Site Investigation, Data Collection & Mapping
Site documentation by groups.
Free format: Apps, Photographs, Videos, Samples (sound, matter,
tests); Interviews, Advertisement, Real Time Data, sketches,
diagrams, etc.

**Session 6**

**Site/Environmental Analysis**
(Working session and deskcrits)

**Session 7**

**Site/Environmental Analysis**
Final Site Diagnosis: Problems and Potentials
**Exercise #3: Site Analysis / Data**

**Session 8**

**Conceptual Design - Research Topic Definition / Deskcrits**
Problem, Thesis, Hypothesis

**Session 9**

**Conceptual Models To Represent Data**
Lecture: Datascapes / Mapping vs Tracing.
Mapping strategy for each research topic

Formalizing Data
Study Models of Formal Systems
File prep for digital fabrication
**Exercise #4**
Task: Group physical model
Document digital fabrication sequence (pictures, videos, digital files for printing, etc.).

**Session 10**

**Conceptual Design - Mapping Strategy For Each Project**
Lecture: "Formalizing Data"
Task: File prep for digital fabrication
Identify problem/research topic to investigate

**Session 11**

**Presentation To Ciee Delegation**
Site Investigation, Data Collection, Mapping & Diagnosis
Study Models of Formal Systems suitable (document digital

fabrication)

**Exercise #4: SITE MODEL to represent data**

**Session 12**

**Mapping Strategy**
Lecture: "Research Topic, Data, System, and Digital

Representation".

**Session 13**

**Conceptual Design - Project Strategy Definition**
Lecture: "Urban Metabolisms"
Projection Mapping on physical model
Determine existing and proposed conditions
**Exercise # 5: Site Diagram(s) & mapping with fluctuations**

**Session 14**

**Conceptual Design - Project Strategy Definition**
Lecture: Self Sufficient Strategies
**Exercise # 6: SITE MODEL MILLWORK (workshop class)**
Group physical model area
Document digital fabrication sequence (pictures, videos, digital files for printing, etc.)

**Session 15**

**Design Development: Development Of Basic Component & System**
Idea of system (conceptual / formal – system + component / social)
Physical model
Animation of how the proposed system will affect current behavior

**Exercise # 7: Projection Mapping on physical model 1/750 scale**

**Session 16**

**Design Development: Development Of Basic Component & System**
Lecture: "Fundaments of parametric design"
Basic component definition (geometry)
System definition
Parameters related to real time data
**Exercise # 8: Project Strategy**
Idea of system
Physical model / 1:100 scale min

**Session 17**

**Design Development: Site Massing Proposal & Reference Studies**
Lecture: Examples of Ephemeral/ Festival Structures & Referents
System deployment on site by repetition, scaling, stretching, multiplication, etc.
Task: Prepare Mid-Term Presentations

**Session 18**

**Berlin Summit**
Join MIDTERM with Berlin, Prague and Barcelona studios
**Mid-Term Submission:**
Two bonded copies DinA4 printed with all weeks tasks and other docs, sketches, refs; videos
Diagram of behavior studied
Physical Group model
Projection Mapping on physical model (existing and proposed)
2 to 3 options of system
Model and drawing of proposal
Physical Model of proposal
Program layout on site

**Session 19**

**Design Development Of Basic Component & System**
Clarification of midterm feedback

**Session 20**

**Design Development: Morphology Exploration**
Shape morphology studies (Physical & Digital)
**Exercise #9:  Component and formations**

**Session 21**

**Design Development: Variation & Adaptation**

Site Program and layout
Project documentation: Orthographic projections, 3D views
**Exercise #10**
System deployment on site by repetition, scaling, stretching, multiplication, etc.

**Session 22**

**Design Refinement- Site Massing Proposal**

**Session 23**

**Design Refinement**

**Session 24**

**Design Refinement**
**Exercise #11: Project documentation; Orthographic projections, 3D views**

**Session 25**

**Design Refinement**

**Session 26**

**Design Refinement**
Lecture: Prototypes (Working physical models of basic component and system)

**Session 27**

**Communication / Presentation / Publishing**
**Exercise #12: Renders and animations**

**Session 28**

**Communication / Presentation / Publishing**
**Exercise #13: Animation of system behavior proposed**

**Session 29**

**Final Presentation and Exhibition (public)**
**Final Submission:**
Project and Documentation (printed in 11x17 format and E-Book)
Site Plan (1:200 scale)
Sections (1:100 scale min)
Elevations (1:100 scale min)
Renders (min 2)
Animation (min 1)
Details (if required)
Physical Models: Document process with pictures or videos produced in IAAC Fab Lab. Digital Fabrication Model Making Physical Group model 1/750 scale? with projection mapping of existing and proposed conditions

Area model Proposal (Scale 1:100)
Detail of part (module/prototype)
Model 1/100 of a fragment of the proposal
All previous models built during the semester
PDF includes a selection of all documents produced during the
semester (3D model, plans, sections, diagrams, sketches,
Animation, images, video). Use the Berlin Summit template with
the Global AD, CIEE and IAAC logos.

## Readings

Allen, Stan; McQuade, Marc. From Biological To The Geological. Landform Building:
    Architecture's New Terrain, 2011
Allen, Stan. Infrastructural Urbanism / Diagrams Matter / From object to field.

Busquets, Joan. Barcelona: The Urban Evolution of a Compact City. Nicolodi & Harvard
    University Graduate School of Design, Actar Distribution, 2006. Selected
    chapters:
    3.2 Major pluri-municipal projects of the turn of the century
    3.4 Big cities in Europe
    3.5 Opportunities and weaknesses
    Maps of the city

Castells, Manuel. The Rise of the Network Society. The Net and the Self.

Hensel, Michael; Menges, Achim; Weinstock, Michael. Morpho-Ecologies: Approaching
    Complex Environments, Achim Menges. AD Emergence - Morphogenetic Design
    Startegies. Wiley, May/June 2004.

Johnson, Steven. Emergence: The connected lives of ants, brains, cities and software
    Chapter 2: Street Level

Koolhaas, Rem. Bigness or the Problem of Large. 1994

Koolhaas, Rem. What Ever happened to Urbanism? 1994

Lynn, Greg. 1994 Architectural Curvilinearity: The Folded, the Pliant and the Supple.

Marshall, Tim. Transforming Barcelona. London, New York: Routledge, 2004.
    Chapter 1: Introduction
    Chapter 13: Changing course? Principles and tools for local sustainability. Enric
    Tello

Mostafavi, Mohsen. Ecological Urbanism. Ed. Baden: Harvard University GSD, Lars
    Müller Publishers, 2010.

Mostafavi, Mohsen. Envisioning Ecological Cities, Mitchell Joachim 102. Ecological Urbanism, Lars Müller Publishers

Mostafavi, Mohsen. Why Ecological Urbanism? Why Now?

Mumford, Lewis. What is a city?. New York: Architectural Record, 1937.

Ryan, Zoe. Building with water: concepts, typology, design. Basel: Birkhäuser, 2010

Schumacher, Patrick. Parametricism: A New Global Style for Architecture and Urban Design.