EPFL 2026/27
AR-476
U.E.U: CARTOGRAPHY

Bárbara Mações Costa

Johann Bayer, *Uranometria*, 1603

LECTURER

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INFO

PROGRAMME	Architecture Master 1 and 3	HOURS	5h weekly × 12 weeks
LAGUAGE	English	SCHEDULE	Fridays 13-18h, in room AAC 114
CREDITS	4	MOODLE	https://go.epfl.ch/AR-476
SEMESTER	Fall	WEBSITE	https://ueucartography.com

SUMMARY

Teaching unit on cartography and environmental aesthetics in architecture.

SESSIONS

1. Cartography and Modern Abstraction
2. Drawing: Visual Layers
3. Tracing: Spatial Figures
4. Mapping: Environmental Formations
5. The Dialectical Method
6. MIDTERM REVIEWS
7. GIS Workshop w/ Aurèle Pulfer
8. The Map as Critique and Praxis
9. Landlines: Pipe, Enclosure, Frontier
10. Guest Lecture TBA
11. Guest Lecture TBA
12. FINAL REVIEWS

CONTENT

Maps are visual tools for thinking about the world at many scales. They shape scientific hypotheses, organize political and military power, delineate private property, and reflect mental conceptions of landscapes and nonhuman nature.

In the Western tradition, medieval maps were less territorial descriptions than conceptual cosmologies, often depicting biblical stories, mythology, history, flora, fauna, and exotic peoples and species.[1] With the advent of modernity, an important shift took place. Cartesian perspectives traced the world in relation to a fixed human subject, while mathematical God's-eye views surveyed the land from an abstract, elevated 'nowhere'. Accurate maps—stripped of all elements of fantasy, religious belief, and authorship—became essential tools for modern scholars and states who sought rational progress through scientific prediction, social engineering, and planning. Cartography became concerned with analyzing and measuring the *res extensa*, and the land survey became a crucial instrument of capitalist development.

Capitalism required the invention of "space as emptiness, as a universal receptacle in which objects exist and events occur, as a frame of reference, a coordinate system . . . within which all reality exists."[2] But the flip side of treating the environment as an abstract container is treating architecture as an abstract object—disembedded, consumed, and aestheticized for its own sake. From this radical separation, maps become quantitative systems for managing phenomena, while buildings become circulating commodities for the valorization of land rent.

But the environment is not a mere backdrop or a container of natural resources, just as architecture is not a collection of objects floating in a vacuum. Buildings and landscapes constitute each other dialectically and cartography can render this dynamic concrete.

This teaching unit offers a critical method for embedding architecture in the environment. By mapping buildings in their space and time, we reveal the invisible backgrounds that make up their material conditions of possibility. The aesthetic choices conveyed in the so-called 'object' thus appear no longer disinterested, but complex, as a rich totality of environmental relations.

1. The term 'cartography' was coined at the beginning of the nineteenth century, based on the Latin *charta*, meaning 'paper' or 'map', and *-graphia*, meaning 'description', which derives from *graphein*, meaning 'to write' or 'to draw'. It is an umbrella concept derived from older terms such as geography, chorography, and topography, respectively meaning the description of *geo* or 'earth', *khōra* or 'region', and *topos* or 'place'.
2. Neil Smith, *Uneven Development: Nature, Capital and the Production of Space* (London and New York: Verso, 2010), 95.

THEME

The selection of objects to be mapped aligns with the content of the associated history and theory courses, Modernity I (AR-510) and Modernity II (offered in 2027 only). A provided list of buildings will feature objects dating from the Modern era (1789–2008). The overarching theme, Land Constellations, reflects the shared method employed across both UE U and the Modernity courses.

METHOD

This unit explores cartography's internal contradiction between sensuous perspective and rational plan, with a sceptical view towards claims of mathematical truth. The method borrows tools from art, urban planning, and history. Hand drawing guides the initial process of abstraction and layering. Planning offers a set of spatial figures as metaphors for the urban palimpsest. A dialectical approach to history orders those figures into a meaningful montage. Theoretical content is provided through weekly lectures; practical assignments are supported by table reviews (scheduled in advance to cover the whole class every two weeks). Group discussions involve close readings of historical maps, as well as texts and films on cartography, landscape and environmental aesthetics. Special emphasis is placed on hand drawing, Adobe Illustrator and GIS, but no previous experience is required.

ASSESSMENT

Continuous assessment:
- Intermediate exercises and class participation: 20%.
- Midterm review: 20%
- Final review: 60%.

All lectures will be held in English, reviews and table crits may be held in English or French.

LEARNING OUTCOMES

Preparation for design and research studios that reflect on cross-scale relationships and the environmental backgrounds of architectural form. Provides methodological support for orientation C. Cities – Territories and *Enoncé théorique de master*. Content is closely related to history and theory course Modernity I (AR-510), which offers a text-based version of the same critical question and method. Enrolment in UE U is limited to 30 students maximum. Modernity I has unlimited enrolment.

EXPECTED COSTS

Costs may vary according to personal investment and project specifics, e.g., printing costs depend on the size of maps and the amount of work produced by the students. An afternoon excursion to the Geneva Botanical Gardens and a list of optional and compulsory drawing materials should cost ca. 60CHF.

GENERAL BIBLIOGRAPHY

- AURELI, Pier Vittorio. "Life, Abstracted: Notes on the Floor Plan." *e-flux Architecture*, October, 2017.
- HARVEY, David. "The Experience of Space and Time." In *The Condition of Postmodernity*, 201–326. Blackwell, 1990.
- MAÇÃES COSTA, Bárbara. "Conduit, Patio, Waste Mapping Environmental Relations in Bairro da Malagueira." Ph.D. diss. École polytechnique fédérale de Lausanne, 2021.

Top: Bedolina Map; Tabula Peutingeriana; Pietro del Massaio, Map of Rome after Ptolemy.
Middle: Rosselli's View of Florence; Portuguese Portolan map; Mercator map
Bottom: Survey of Philadelphia; Buckminster Fuller's Dymaxion map; Satellite photograph of Berlin.

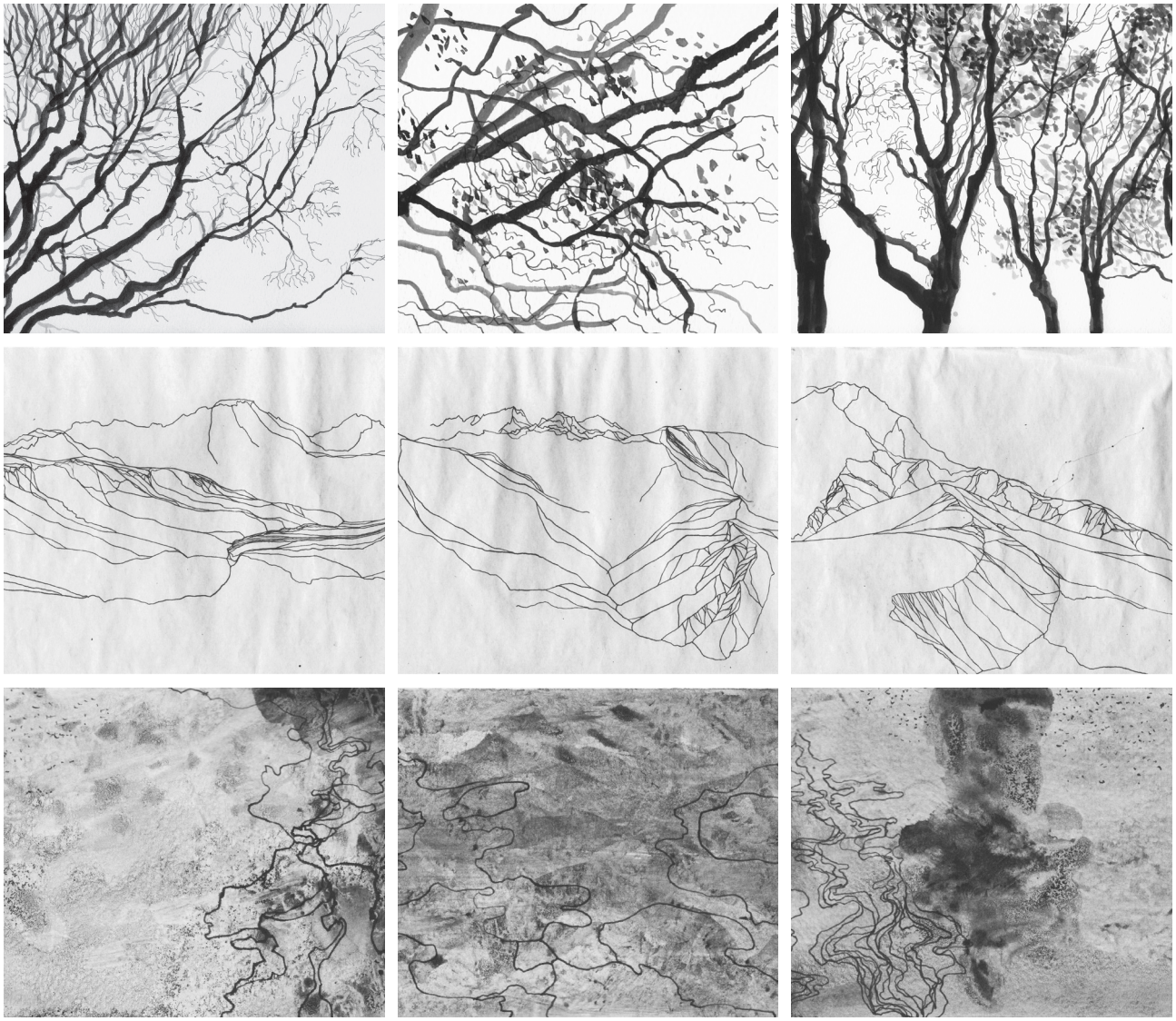
1. CARTOGRAPHY AND MODERN ABSTRACTION

11 September

Lecture: The rise of modern territorial abstraction and the transition from cartographic "description" (*-graphie*) to the more quantitative nature of the land survey. Premodern maps and the sensuous experience of local space-time vs. modern synoptic vision: the survey's goal to annihilate space and time. Land enclosure, "improvement," and ecological imperialism: capital trying to free itself of its material barriers. Naturalization vs. historicization.

Activities: Introduction to class goals, presentation of list of buildings to map, partial screening of *David Hockney: A Bigger Picture* (2009).

- BLOMLEY, Nicholas. "Law, Property, and the Geography of Violence: The Frontier, the Survey, and the Grid." *Annals of the Association of American Geographers* 93, no. 1 (March 2003): 121–141.
- ELDEN, Stuart,."Land, Terrain, Territory." *Progress in Human Geography* 34: 6 (Dec 2010): 799–817.
- ESCOLAR, Marcelo. "Exploration, Cartography and Modernization of State Power." In *State/Space: A Reader,* edited by Neil Brenner et al. Blackwell, 2003, pp. 29–52.
- FARINELLI, Franco, *La crisi della ragione cartografica*. Einaudi, 2009.



Drawings from Bárbara Maçães Costa, Master thesis FBAUL, 2016.
Vegetation, Topography, Hydrography.

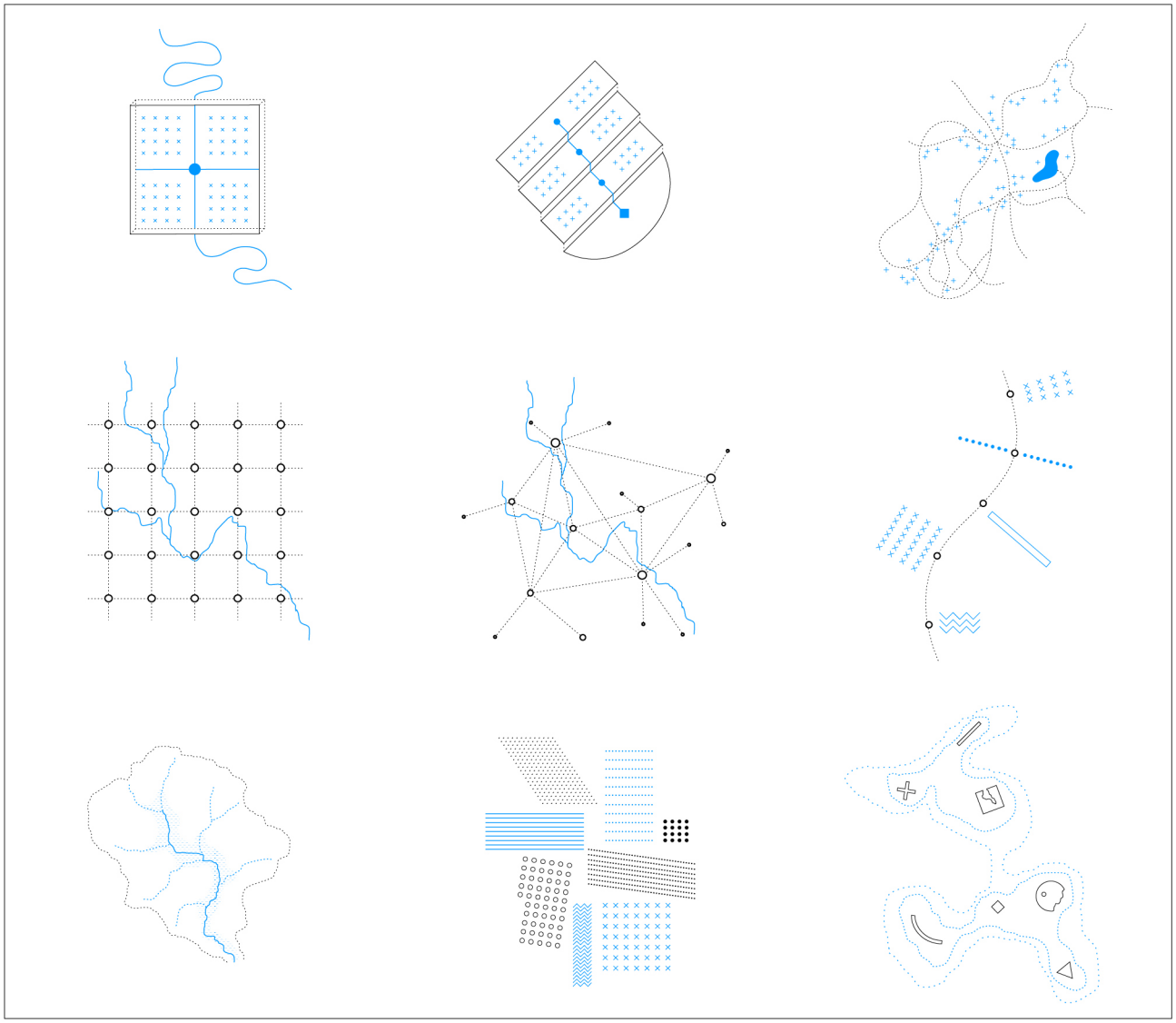
2. DRAWING: VISUAL LAYERS

18 September

Lecture: Introduction to drawing's basic challenges: hierarchy of weights, relational composition between elements, the presence and shape of voids, the problem of stereotypes, the unconscious tendency for symmetry, fear of complexity, etc. Introduction to hand drawing materials, wet and dry. Patterns of graphic codes: lines, dots, blots, voids, colours.

Activities: Exercise I – Drawing: quick hand drawing exercises from projected photographs of landscapes, with the goal of extracting and overlaying graphic layers. Possible live drawing at the Geneva Botanical Gardens.

- BERGER, John. "The Basis of All Painting and Sculpture is Drawing." In *Landscapes: John Berger on Art*, 27–32. Verso, 2016.
- MAÇÃES COSTA, Bárbara. "Desenho de paisagem: investigações sobre representação espacial." Master diss. Faculdade de Belas-Artes da Universidade de Lisboa, 2016.



Spatial Systems:
Cloister, Garden, Park.
Grid, Network, Line.
Watershed, Patchwork, Archipelago.

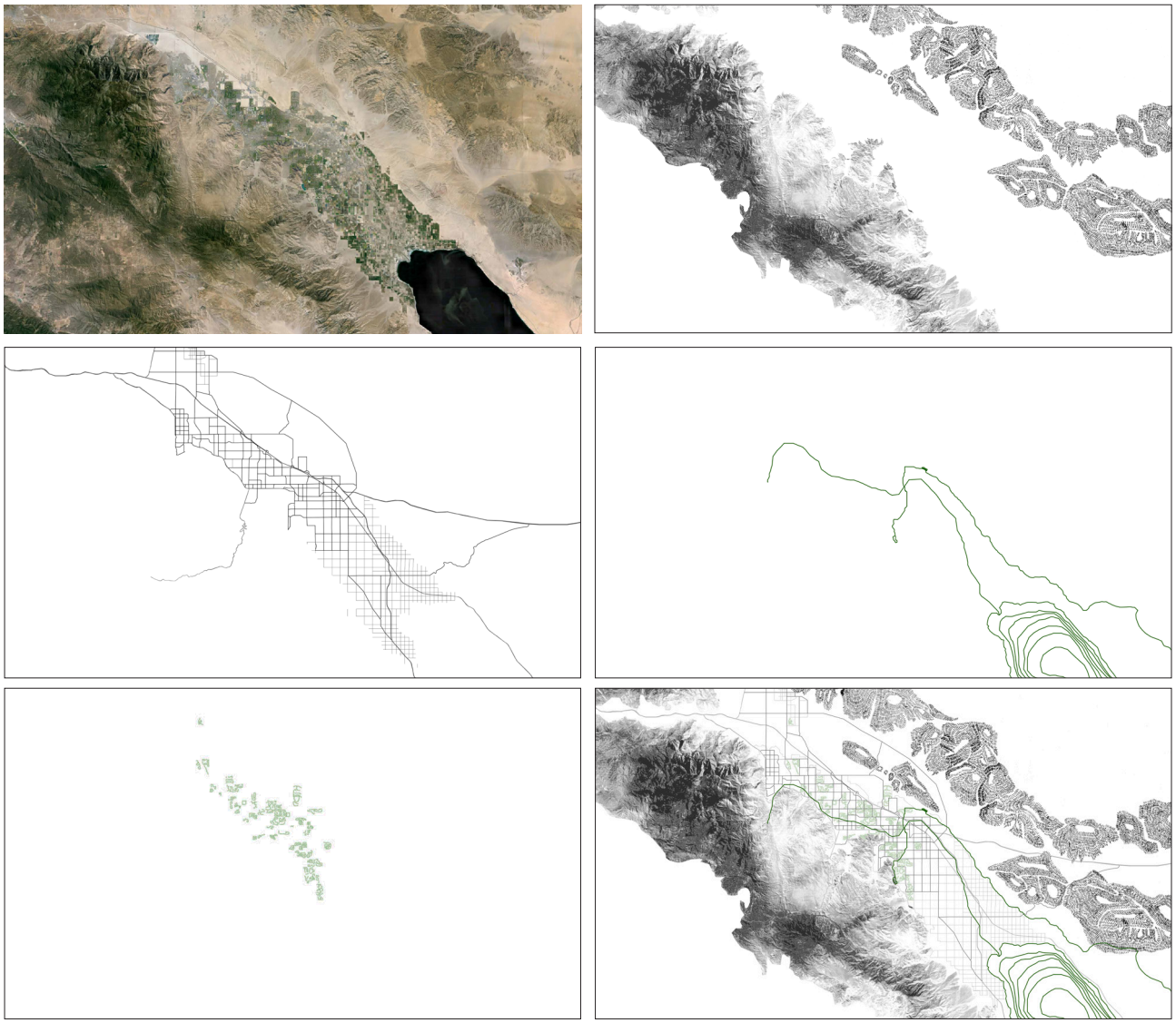
3. TRACING: SPATIAL FIGURES

25 September

Lecture: Decoding the land as palimpsest. Rendering graphic layers more concrete by organizing them into typologies of land systems. These systems are nevertheless abstract rationalizations, diagrams to be used as figures of speech in our developing understanding of the environment.

Activities: Exercise II – Plan: mixed hand and computer drawing exercise from chosen building plan, with the goal of extracting and overlaying the builgding's layers: slab, structure, cladding.

- CORBOZ, André. "Le territoire comme palimpsest." *Diogène* 31, no. 121 (Jan–Mar 1983): 14-35.
- SMITHSON, Robert. "A Provisional Theory of Non-Sites." In *Robert Smithson:The Collected Writings*, edited by Jack Flam, 364. University of California Press, 1996 [1968].



Map by Gilda Gysin, *Coachella Valley, California*, EPFL UEU 2015.
Aerial view, or frame. Topography.
Infrastructure. Hydrography.
Vegetation. Total map.

4. MAPPING: ENVIRONMENTAL FORMATIONS

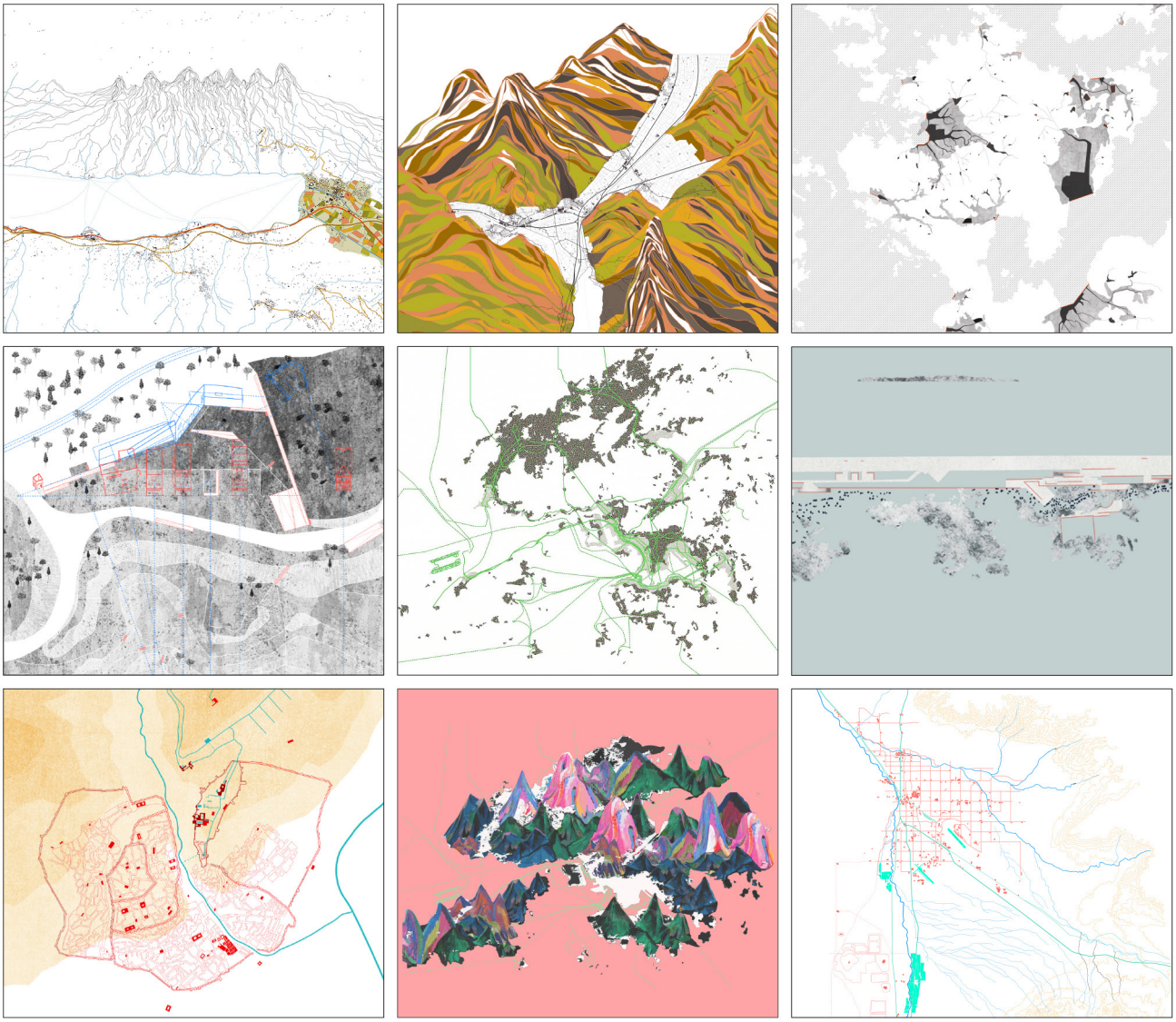
2 October

Lecture: A four-fold method:

1) Identify and frame site,
2) Extract layers separately with individual graphic identities,
3) Combine graphic layers to form spatial systems,
4) Contextualize building as an environmental totality, i.e., a relational loop of nature + technology + production + reproduction + aesthetics.

Activities: Exercise III – Map: begin historical research collecting historical maps and essays on the urban development of the chosen building's site.

- COSGROVE, Denis E., *Social Formation and Symbolic Landscape*. University of Wisconsin Press, 1984.
- JAMESON, Fredric. "Cognitive Mapping". In *Marxism and the Interpretation of Culture*, edited by Cary Nelson and Lawrence Grossberg, 347-60. University of Illinois Press, 1988.



Studentwork: Mapping exercise, EPFL UEU, 2015-21.

5. THE DIALECTICAL METHOD

9 October

Lecture: A totality of environmental relations:

1) Nature: geography, ecosystems, climate, raw materials.
2) Technology: infrastructure, land management and construction techniques.
3) Production: economic practices, labour and property relations.
4) Reproduction: divisions of labour, social hierarchies, institutions, rituals.
5) Aesthetics: ideology, beliefs, culture, politics.

Activities: table reviews.

- HARVEY, David. "What Technology Reveals." In *A Companion to Marx's Capital: The Complete Edition*, 191–203. Verso, 2018 [2010].
- MAÇÂES COSTA, Bárbara. "The Totality of Environment." *Modernithy, Architecture & the Environment* 2 (August 2024): 1–7.

6. MIDTERM REVIEWS

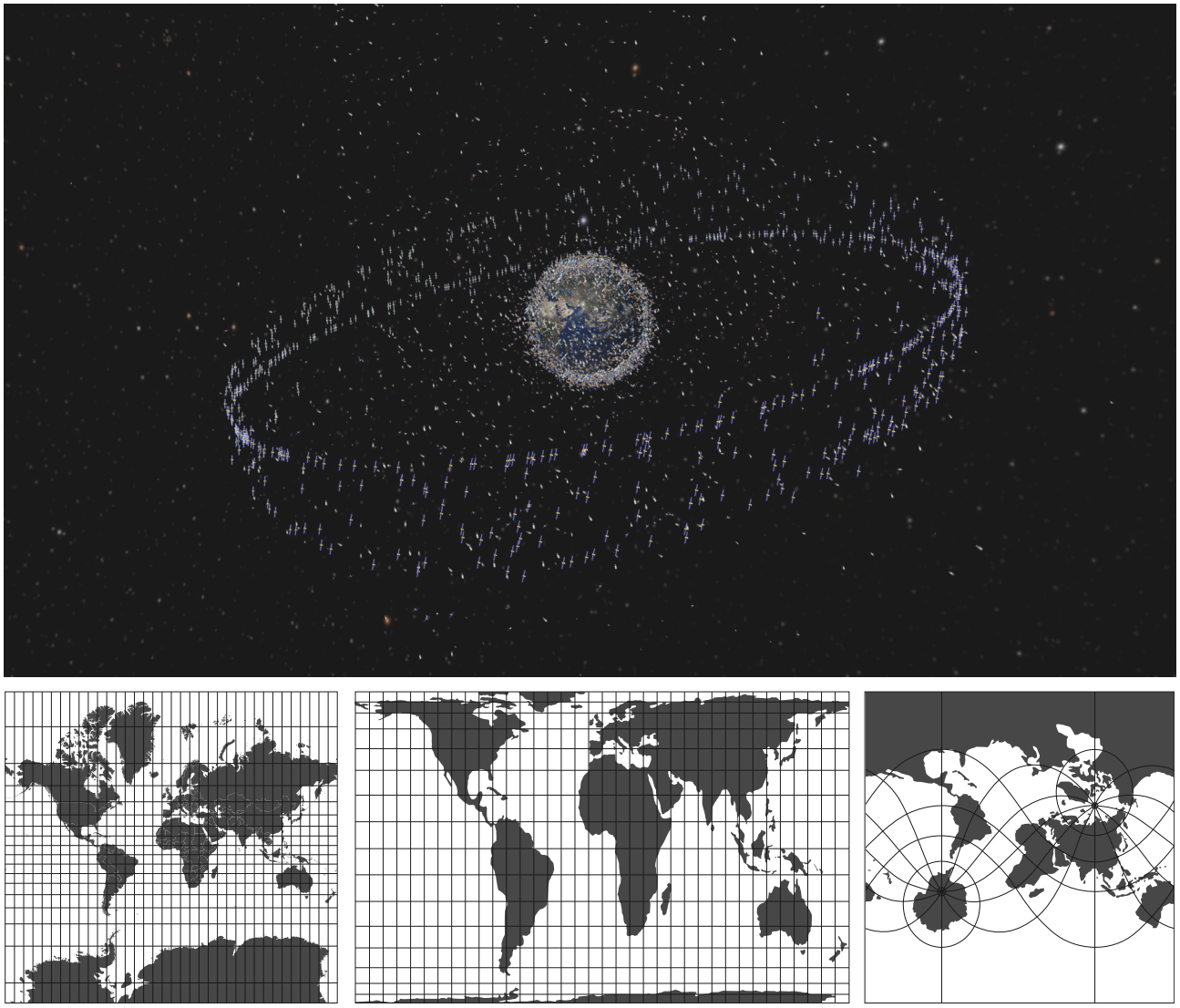
16 October

DELIVERABLES

- Drawing exercise: show during pin up.
- Tracing exercise: print and pin up for review.
- Map excercise: aerial photo and map, print and pin up side-by-side on the same scale and frame.
- Architectural object: extra drawings, historical maps, and photos.

PRESENTATION (5-7MINUTES)

1. OBJECT: what is it, where is it, when was it built, who is the architect (use photos).
2. FRAME: what you take to be part of your object's environment (use aerial photo).
3. LAYERS: what cartographic layers you extract from aerial view, how you represent them, how you combine them (use map and extra layers if needed, use historical maps).
4. SYSTEM: how your layers combine to make territorial systems.
5. TOTALITY: what that building does environmentally, how it interacts with the territorial systems and how it becomes an agent of spatial contradictions. Explain relational loop of: nature + technology + production + reproduction + aesthetics.
6. CONCLUSION: How does your object internalize an idea of the urban-environmental whole?



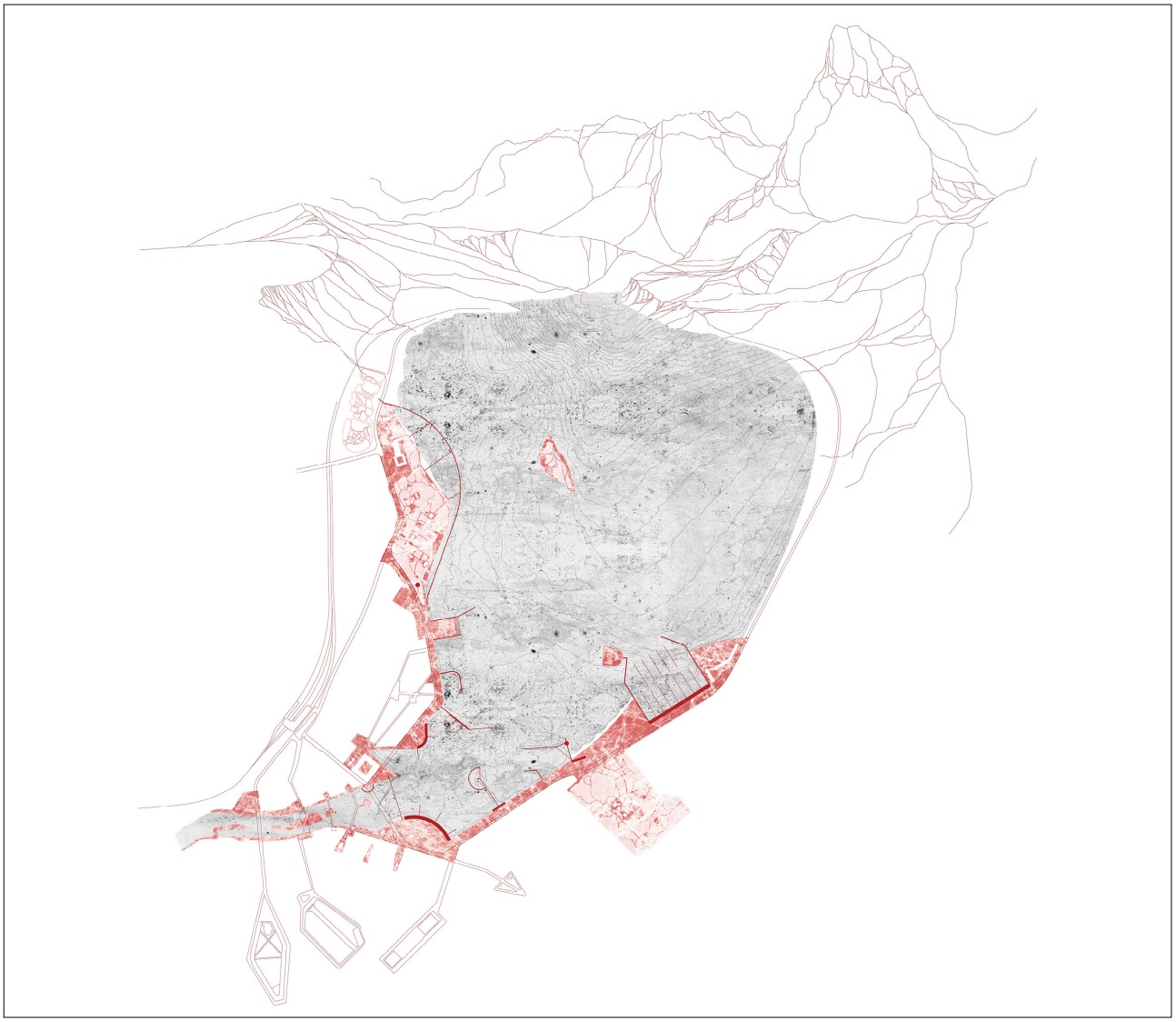
Top: European Space Agency, map of all trackable satellites and space debris orbiting Earth, 2008.
Bottom: Comparative diagrams of Mercator projection, Gall-Peters projection, and Oblique Mercator projection with curved rhumb lines.

7. GIS WORKSHOP W/ AURÈLE PULFER

30 October

Lecture: The GIS data processing cycle: abstraction, acquisition, archiving, analysis, displaying, anticipation. Parallels with the 'analogue' work modes. How to think with GIS: possibilities, misconceptions, biases, and correct use. Beginner's user guide and open data sources.

Activities: GIS exercise and table reviews.



Bárbara Maçães Costa and Truwant + Rodet +, *La Rade de Genève*, 2017.

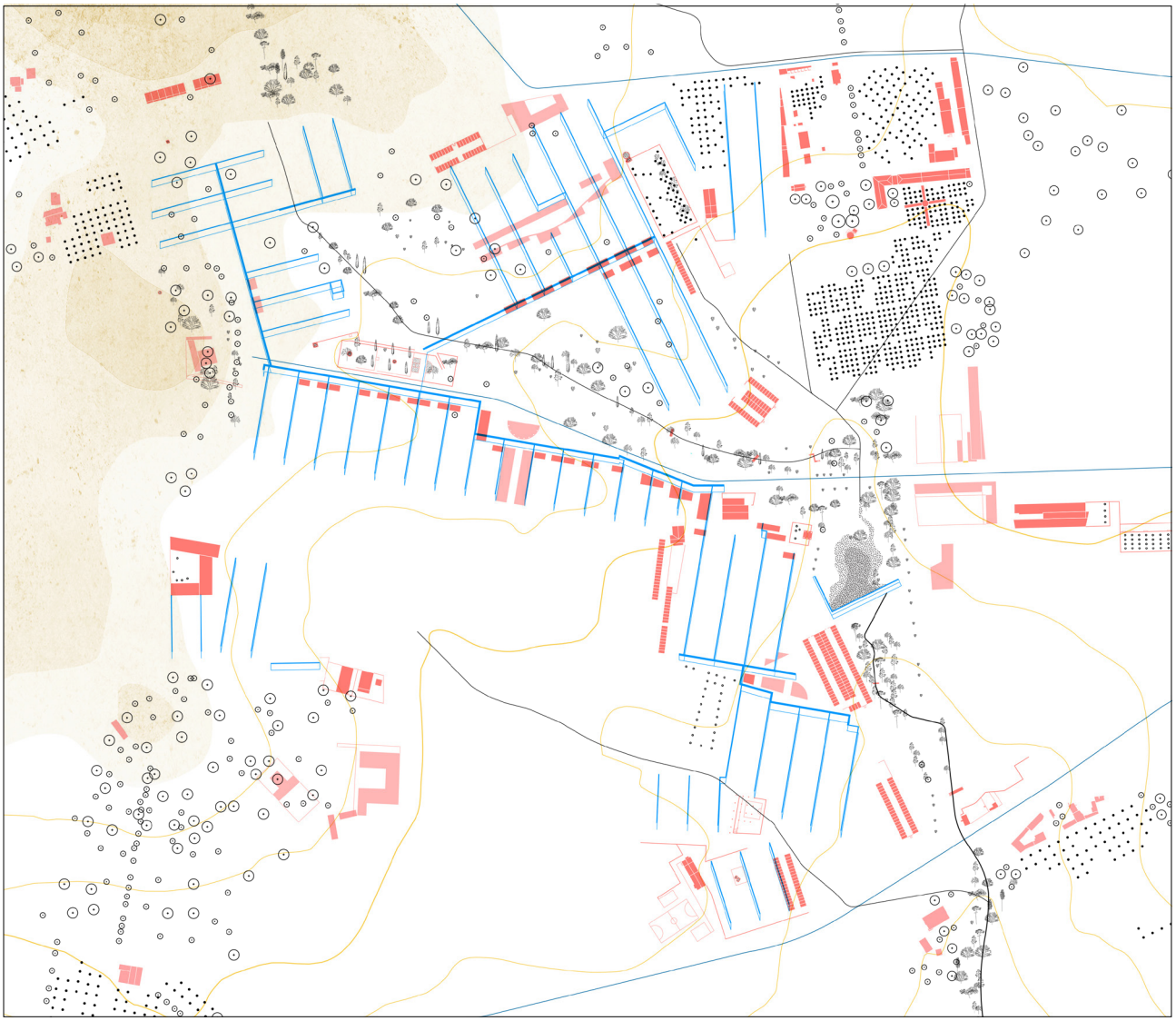
8. THE MAP AS CRITIQUE AND PRAXIS

6 November

Lecture: The map as a critique (negation) of the site. Practice as the dialectical unity of work and subjectivity, i.e., construction and criticism. Examples of the course method employed in the elaboration of landscape architecture projects.

Activities: table reviews.

- MAÇÃES COSTA, Bárbara. "Cartography's Weak Messianic Power." *L'Atelier* 21 (June): 86–92.
- SMETS, Bas, *Landscape Stories*. Peinture Fraiche, 2016.



Bárbara Maçães Costa, Bairro da Malagueira's conduits from "Conduit, Patio Waste," Ph.D diss, EPFL, 2021.

9. LANDLINES: PIPE, ENCLOSURE, FRONTIER

13 November

Lecture: A conduit is a 'pipe' that extracts a resource from a place of abundance and transports it to a place of relative scarcity. A patio is a piece of nature transformed into landed property, a domesticated, fenced-off open space that may be privately or collectively owned. A wasteland is an empty piece of land that lacks investment. It is wasted because it has not yet been 'improved' and thus does not yield a profit.

Activities: table reviews.

- MAÇÃES COSTA, Bárbara. "Conduit, Patio, Waste Mapping Environmental Relations in Bairro da Malagueira." Ph.D. diss. École polytechnique fédérale de Lausanne, 2021.

Past guest lectures, UEU 2025: Douglas Murphy (Kingston University), Dries Rodet (EPFL).

10–11. GUEST LECTURES W/ TBA

20, 27 November

The last two lectures of the semester are given by guests who expand upon the theme of mapping in architecture and the relationshiop between object and whole. Previous guests have included: Douglas Murply, Dries Rodet, Alex Gore, Will Guthrie, Faiq Mari, Nitin Bathla, Denise Bertschi, Nazli Tümerdam, Godofredo Pereira, Charlotte Truwant, Christoph Kueffer, Ursula Biemann, Roberto Gargiani, Chiara Cavalieri, Sébastien Marot, Christian Gilot, Giovanni Piovene, and Paola Viganò.

Activities: table reviews.

12. FINAL REVIEWS

4 December

DELIVERABLES

- Drawing exercise: show during pin up.
- Tracing exercise: rework, print and pin up for review.
- Map excercise: aerial photo and map, print and pin up side-by-side on the same scale and frame.
- Architectural object: extra drawings, historical maps, and photos.
- Text in bullet-points following presentation structure.

PRESENTATION (5-7MINUTES)

1. OBJECT: what is it, where is it, when was it built, who is the architect (use photos).
2. FRAME: what you take to be part of your object's environment (use aerial photo).
3. LAYERS: what cartographic layers you extract from aerial view, how you represent them, how you combine them (use map and extra layers if needed, use historical maps).
4. SYSTEM: how your layers combine to make territorial systems.
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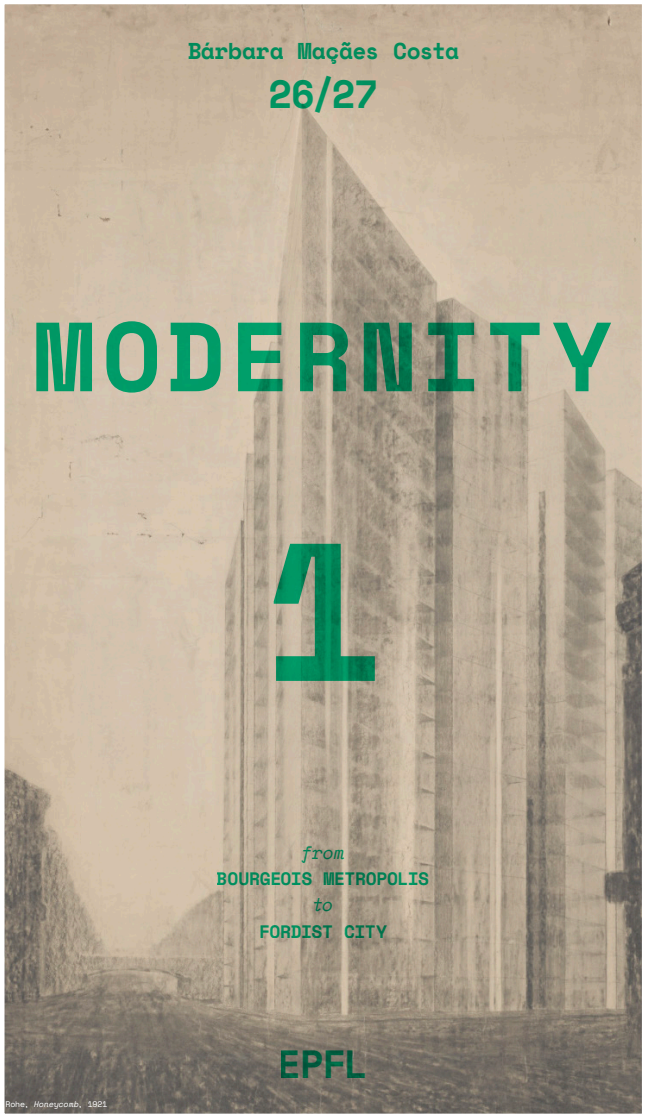
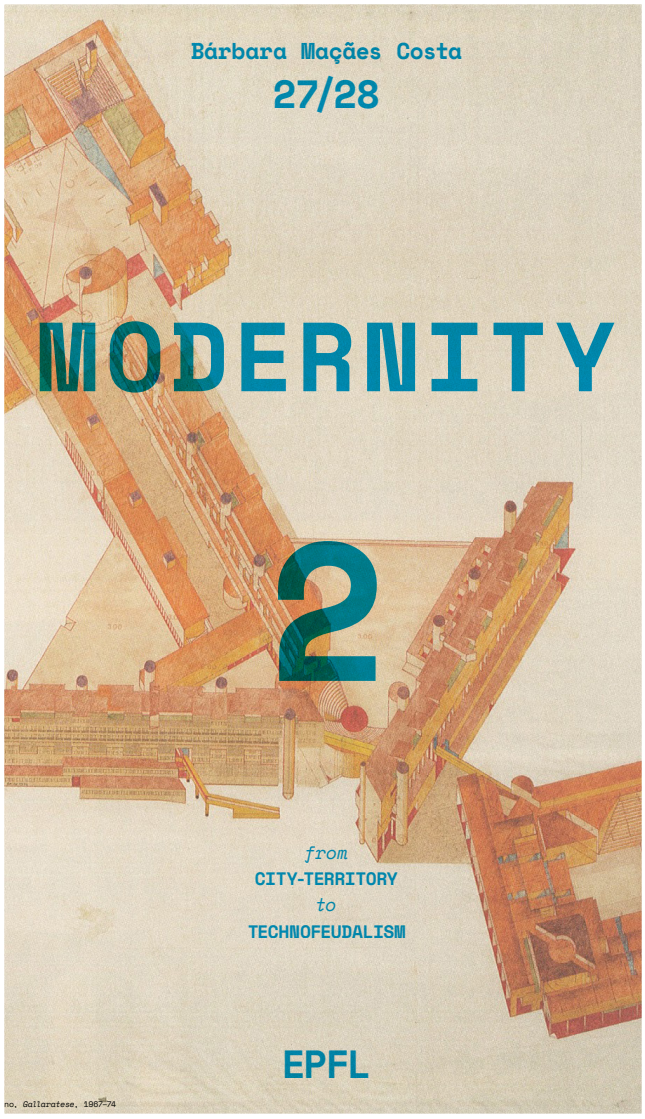
6. CONCLUSION: How does your object internalize an idea of the urban-environmental whole?





New format: AR-510 Modernity I (FS26) and Modernity II (FS27).
These two new courses replace AR-505 Modernity, Architecture & the Environment.

ASSOCIATED MODULES: MODERNITY I / MODERNITY II

Modernity I and Modernity II are alternating theory courses that offer a history of modern environmental aesthetics in architecture. Modernity I: From Bourgeois Metropolis to Fordist City, will take place in the fall semester of 2026 and repeat every even year. Modernity II: From City-territory to Technofeudalism, will take place in the fall semester of 2027 and repeat every odd year. The two new courses replace the previously unified module AR-505 Modernity, Architecture and the Environment.

The buildings mapped by students in UE U align with the scope and timeline of the Modernity courses. Both modules employ the same structural method, differing only in their primary medium—moving from drawing to text. Enrolment in UE U is limited to 30 students; Modernity I and II have unlimited enrolment.

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