

CIVIL-475

**UE génie civil : Docta Manus**

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Cursus	Sem.	Type
Architecture	MA1, MA3	Opt.
Génie civil	MA1, MA3	Obl.

Langue d'enseignement	français
Crédits	4
Retrait	Non autorisé
Session	Hiver
Semestre	Automne
Examen	Pendant le semestre
Charge	120h
Semaines	14
<b>Heures</b>	<b>4 hebdo</b>
Cours	2 hebdo
Exercices	2 hebdo
<b>Nombre de places</b>	<b>25</b>

**Il n'est pas autorisé de se retirer de cette matière après le délai d'inscription.**

**Résumé**

L'Unité introduira le dessin comme l'outil clé de la communication entre ingénieurs et architectes et comme médiateur entre la construction et l'étudiant. Grâce au dessin, nous analyserons des projets structurels sélectionnés qui incarnent une interaction exemplaire entre l'espace et la structure.

**Contenu**

Drawing constitutes a very powerful and critical tool of conceptual design. Drawing constructs thought, it acts as a communication interface between the work and the mind and between different disciplines; it is the most powerful language of communication in the working together between architects and engineers.

The UE Docta Manus Structures will introduce the basic drawing techniques (sketch, plan, section, elevation, axonometry, perspective). Based on these techniques, we will further investigate analytical drawing methods capable of exploring structural concepts and their architectural solutions.

Through hand drawing we will analyse selected projects that embody an exemplary interplay of architecture and engineering, as e.g. the work of Mies van der Rohe, Jean Prouvé, Luigi Nervi, Robert Maillard or Eugène Freyssinet. Our main focus lies on the load bearing structure and its tectonic and spatial articulation as common intersection between architecture and engineering. Through analysis, students will enter into dialogue with construction in a direct way. They will get a sense for the adequacy of tools and refinements of solutions. We will investigate proportion, material innovation and tectonic articulation in relation to the structural idea and become aware of the importance of detail. Analysis will take apart and make transparent the parameters and dependencies of the design process and will open the work into a condition of possibility.

We will draw by hand, as this is the most direct and immediate way of becoming aware of technique in relation to intention (it forces to take decisions). Drawing by hand is a cognitive process where the dynamic relation between doing and thinking is essential. That is why 'the more you draw, the more you see' and vice versa. The construction of points and lines on a sheet of paper will sensitize students to the notions of scale, size, proportion, transparency and composition. The learning hand will build up tacit knowledge.

**Mots-clés**

Hand drawing, analysis, structures, tectonics, tacit knowledge.

**Compétences requises**

**Concepts importants à maîtriser**

- To understand and master the basic drawing techniques: sketch, plan, section, elevation, axonometry, perspective, structural sketch, structural plan.
- To understand the geometric logic of two-dimensional drafting planes and their implications in three-dimensional space;
- To analyse the structural and tectonic logic of a given project by means of an adequate analytical drawing method;
- To understand key structural concepts and their material solutions;
- To develop an understanding of material limits, material innovation and mounting principles;
- To become aware of the enhanced potential of a project designed on the basis of a dialogue between architecture and engineering;
- To develop a coherent argument through drawing.

### Acquis de formation

A la fin de ce cours l'étudiant doit être capable de:

- Analyser
- Investiguer
- Construire
- Comparer
- Analyser
- Investiguer
- Construire
- Comparer

### Compétences transversales

- Communiquer efficacement et être compris y compris par des personnes de langues et cultures différentes.
- Dialoguer avec des professionnels d'autres disciplines.
- Faire preuve d'inventivité
- Faire preuve d'esprit critique

### Méthode d'enseignement

Hand-drawing, lectures, collaborative discussions; interdisciplinary teaching team

### Travail attendu

Ongoing evaluation; students will be evaluated on the basis of the following criteria:

- ability to work in drawing as construction;
- capacity to use analysis as a means of advancing an architectural and structural idea;
- collaboration (communication, team work, flexibility within different roles);
- engagement (participation, initiative, responsibility)

### Méthode d'évaluation

Ongoing evaluation; students will be evaluated on the basis of the objectives stated in learning outcomes and their engagement (critical thinking, participation, initiative, collaboration).

## Ressources

### Bibliographie

#### Bibliographie UE Docta Manus 2023\_SG ( PG)

Berger, J. (2008). *Ways of seeing*. Penguin uK.

Dethier, J. (1984). *Images et imaginaires d'architecture : Dessin, peinture, photographie, arts graphiques, théâtre, cinéma en Europe aux XIXe et XXe siècles* (Número 18847). Centre National D'Art Et de Culture Georges Pompidou.

Gargiani, R., & Bologna, A. (2016). *The rhetoric of Pier Luigi Nervi. Concrete and ferrocement forms* (Número BOOK). Epfl Press.

Greco, C. (2008). *Pier Luigi Nervi : Dai primi brevetti al Palazzo delle Esposizioni di Torino 1917-1948*. Quart Verlag.

Nervi, P. L., & Desideri, P. (1982). *Pier Luigi Nervi*. JSTOR.

Pérez-Gómez, A., & Pelletier, L. (1997). *Architectural representation and the perspective hinge*. Mit Press Cambridge, MA.

Rice, P. (1994). *An engineer imagines*. Artemis London.

Schon, D. A. (1968). *The reflective practitioner*. New York.

Spiro, A., & Ganzoni, D. (2013). *The working drawing: The architect's tool*. Park Books.

Guaita, P., 2023. *Acción y experiencia en la arquitectura. Materia y corporalidad en la enseñanza de la era tecnológica.*, Doctoral tesis directed by the Dr. Aurora Herrera Gómez and Dr. Ma Auxiliadora Gálvez

Pérez, Universidad CEU San Pablo Madrid.

<http://hdl.handle.net/10637/14201>. <https://infoscience.epfl.ch/record/301732?ln=fr>

### Ressources en bibliothèque

- [The rhetoric of Pier Luigi Nervi / Gargiani & Bologna](#)
- [Pier Luigi Nervi : Dai primi brevetti al Palazzo delle Esposizioni di Torino 1917-1948 / Greco](#)
- [Pier Luigi Nervi / Nervi & Desideri](#)
- [Acción y experiencia en la arquitectura / Guaita](#)
- [Acción y experiencia en la arquitectura / Guaita \(online\)](#)
- [The working drawing / Spiro & Ganzoni](#)
- [Architectural representation and the perspective hinge / Pérez-Gómez & Pelletier](#)
- [The reflective practitioner / Schon](#)
- [Ways of Seeing / Berger](#)
- [Images et imaginaires d'architecture / Dethier](#)
- [An Engineer Imagines / Rice](#)

### Liens Moodle

- <https://go.epfl.ch/CIVIL-475>