UNIVERSITÀ DEGLI STUDI FIRENZE

DiDA – DIPARTIMENTO DI ARCHITETTURA/ARCHITECTURE DEPARTMENT
C.d.L ARCHITETTURA MAGISTRALE – Curriculum in **ARCHITECTURAL DESIGN** - **iCAD -** Class LM-4 coc. B076
a.a.2021-22

ARCHITECTURE STRUCTURAL DESIGN LAB

PROF.RICCARDO RENZI (Architectural Design I)
PROF. FABRIZIO ROSSI PRODI (Architectural Design I)
PROF.MARIO DE STEFANO (Structural Design)
PROF.ELENA BELLINI (Building System Design)

Class Overview
The course includes an integrated multidisciplinary teaching in: *Architectural Design*, *Structural Design*, and *Building Systems Design*, focused on structural analysis. The specific educational purposes of a further discussion of the theoretical and operative basis behind structural design and dimensioning are integrated with the more general control of the design and composition, and of its constructive connotations, according to an educational plan aimed at providing, through the new Laboratories, an ever increasing organic consultation between the various aspects involved in the design process. Quick look at http://issuu.com/dida-unifi/docs/icad

Common rules
During class is forbidden to use cell phones, drink and eat, and listen to music, talk loud or act in any way to disturb, etc.. During lecture is forbidden to use also computer etc. The student has to be present at each lecture and each desk critique/review. Each project/assignment deadline as scheduled is mandatory. The student will be able to reach the final exam only if has reached a minimun of 75% of presence at the lessons.

ARCHITECTURAL DESIGN 1 - B018878 - 6CFU –

PROF. RICCARDO RENZI
PROF. FABRIZIO ROSSI PRODI
Teaching assistants: Elena Ceccarelli, Anna Dorigoni, Alessandra Marchetti, Giacomo Troiani, Gabriele Marinari.
Collaborators: Sofia De Stauber, Antonio Ciracì.

Overview
The course is based on the architecture in different scale: from urban to the interior one. The design method start from urban readings and understanding hidden and not hidden rules of architecture. Type, place, memory. Class will have theoretical lectures and pratical work on one or more projects. A series of lectures on italian contemporary built architectures will be held by prof. Fabrizio Rossi Prodi.

Assignment
Before to focus on final project each student will have to deliver (mandatory deadlines) several assignments. These exercises are useful for the student to understand Italian architecture and its particular system of hidden compositional rules, of building, of city, of public space. All the assignments are mandatory and will be delivered to the teacher as scheduled. The student will have also to read some books. All the assignments are held by a single student.

Final Project
Final Project will be the design for a new building; the topic will be cultural (eg. museum, cultural center, exposition center, library, theater). It will focus on building as special architecture and its role in the contemporary space of the city. The student will have to be present at Desk Critique/Review to show the project to the teaching staff. Only when the teaching staff will agree that the project is complete the student will be able to reach the final exam. The Architectural Structural Design Lab will have a single grade for each single student and it will be the mathematical media between the grades of Architectural Design I, Structural Design and Building System Design and its assignments.

Attendance
The student has to be present at each lecture and each desk critique/review. Each project/assignment deadline as scheduled is mandatory. The student will be able to reach the final project only if has reached a minimum of 75% of presence at the lessons. In each Desk Critique/Review student will have to show drawings (handmade or printed) in scale (1:500/1:200/1:100/1:50/1:20

are the scale accepted) and handmade model of the project (1:500/1:200/1:100/1:50). The teacher will not respond at any email from the student asking suggestions or indication on the project/assignment, the Desk Critique/Review is the only way for the student to show the work in progress. For each student is mandatory to sign in at the morning arrive in teacher's register of attendance (even virtual).

Behaviour
During class is forbidden to use cell phones, drink and eat, and listen to music, talk loud or act in any way to disturb, etc.. During lecture is forbidden to use also computer etc. The student should always use an A4 sketch book and drawings tools, plus eventually materials for work on models.

Mandatory readings (a short abstract of these books will be provided by each single student at the end of class)
Le Corbusier, Toward an architecture, 1923
P. Johnson, Mies van der Rohe, 1947-1953
B. Zevi, Architecture as Space, 1948
A. Rossi, The Architecture of the city, 1966
G. Grassi, The Logical Construction of Architecture, 1967
G. Grassi, Architecture dead language, 1988
K. Elam, Geometry of design, 2001
Essential texts
K. Lynch, The image of the city, 1960
E.T. Hall, The Hidden dimension, 1966
N. Pevsner, A history of building types, 1978
C. Norberg-Schultz, Western Architecture, 1979
W. Lotz, Architecture in Italy 1500-1600, 1995
Suggested readings
C. Sitte, City Planning According to Artistic Principles, 1889
F.L. Wright, An organic architecture. The architecture of democracy, 1939 (1945)
W. Gropius, Scope of Total Architecture, 1955
L. Mumford, The city in history, 1961
R. Koolhaas , Delirious New York, 1978
C. Van de Ven, Space in architecture, 1980
K. Frampton, A critical history of Modern Architecture, 1980
D. Watkin, German architecture and the classical ideal, 1987 (1990)
J. Baudrillard, J. Nouvel, The singular object of architecture, 2003
R. Koolhaas, Junkspace, 2006
P. Zumthor, Atmospheres, 2007

Email: riccardo.renzi@unifi.it ----Teacher's page http://www.unifi.it/p-doc2-2015-0-A-2c2a3a293429-1.html

STRUCTURAL DESIGN - B020740 - 6CFU –

PROF. MARIO DE STEFANO
Teaching assistant: Prof. Valerio Alecci

Overview
The Modulus of Structural Design aims at providing the students with the main theoretical bases and code requirements necessary for the structural design in seismic zones. Students will be able to understand the main structural features of reinforced concrete and masonry buildings and problems arising from regularity/ irregular shapes both in plan and elevation; they will also analyse o building damages and collapse mechanisms due to seismic events.

Learning Objectives
The Course of Architectural Structural Design Lab includes an integrated multidisciplinary teaching in: Architectural Design, Structural Design, and Building Systems Design, focused on structural analysis. The specific educational purposes of a further discussion of the theoretical and operative basis behind structural design and dimensioning are integrated with the more general control of the design and composition, and of its constructive connotations, according to an educational plan aimed at providing, through the new Laboratories, an ever increasing organic consultation between the various aspects involved in the design process.

Teaching Methods
Specific topics of the Modulus of Structural Design are presented during initial lectures. Behaviour of materials and structural elements will be also shown by means of experimental testing at the structural Laboratory. Subsequently, structural design of particular elements will be carried out and students will have to present their drawings at Desk Critique/Review to discuss and revise them with the teaching staff.

Further information
During class is forbidden to use cell phones, drink and eat, and listen to music, talk loud or act in any way to disturb, etc.. During lecture is forbidden to use also computer etc. The student has to be present at each lecture and each desk critique/review. Each project/assignment deadline as scheduled is mandatory. The student will be admitted to the final exam only if has reached a minimun of 75% of attendance at the lectures.

Type of Assessment
Final exam will grade the final integrated project

Topics
Lessons from earthquakes:
- L'Aquila seismic event of April 6, 2009.
- Reinforced concrete buildings: damage and collapse mechanisms
- Masonry buildings: damage and collapse mechanisms
- The effect of the structural regularity/irregularity
- Eurocode requirements

Principles of Conceptual Design:
- Structural simplicity
- Regularity
- Bi-directional strength and stiffness
- Torsional strength and stiffness
- Floor slabs as rigid diaphragms
- Adequate foundations

Design of reinforced concrete structural elements:
- Concrete and steel mechanical properties
- Ultimate Limit State
- Serviceability Limit State
- Design of rectangular cross section beams under bending action
- Design of rectangular cross section colums under combined axial and bending actions

Recommended Texts
EC8, Eurocode EN 1998, European Union norm on construction. Design of structures for earthquake resistance, 1998.
Seismic Design of Reinforced Concrete and Masonry Buildings, Paulay, T. and Priestley, N., John Wiley & Sons, 1992.
Design of Earthquake Resistant Buildings, Wakabayashi, M., McGraw-Hill, New York, NY, 1986.
The Seismic Design Handbook, F. Naeim, Ed., Kluwer Academic Publishers, 2001.
Earthquake Resistant Design, Dorwick, D., Wiley, New York, NY, 1989.
Fundamentals of Earthquake Engineering, Newmark, N. and Rosenblueth, E., Prentice Hall, New York, NY, 1971.

BUILDING SYSTEM DESIGN – B020741 – 6CFU

PROF. ELENA BELLINI

Overview
Architectural Technology represents "the art and the science (skills) of making practical, functional and aesthetically pleasing buildings" (Emmitt, 2012). It is concerned with the application and integration of construction technologies in the building design process. The course will start from the fundamentals of building construction and the analysis of different components to aim at the integration of these components in the complex building system.

Topics
- Architectural Technology
  At the beginning it will be provided an introduction of the discipline of Architectural Technology to understand its application in architecture. Students will explore the discipline by a first exercise: each student will choose a building as a case study to analyze the design solutions adopted. Construction details will be redesign to understand different components and their role in the building system. The analysis of the case study will be presented to the class. It will be the starting point from consequent lectures.

- Building construction: fundamentals
  It will be provided a review of fundamentals of construction, looking at the different components of building system. It will be related to performances and design solutions for efficiency, effectiveness, durability and sustainability.

- Building construction: materials
  It will be provided a review of construction materials: properties, use, methods, techniques and application. It will focus on envelope building solutions to show strengths and challenges of different materials in terms of quality and efficiency of architecture. Some exercises will be assigned to investigate the application of materials on the building system; each student will explore one particular material and present it to the class.

- Building system: integrating innovation
  The last part of the modulus will aim at the integration of the diverse components of the building system, applying the acquired knowledge on building technology. It will be the opportunity to explore innovation in modern construction, also by the review of different case studies. This part will be related with the final project, that will represent the application of the acquired techniques and tools to define the feasibility of the project and make technology a resource to gain architecture and building quality.

Teaching Methods and Assignments

The Building System Design Modulus will integrate lectures and practical exercises (individual or in group) about each different topic. Students will be actively involved in presentation, review and discussion of different assignments.
The exercises are mandatory and would be collected as part of the final exam. The student will be admitted to the final exam only if has reached a minimum of 75% of attendance at the lectures.

Recommended Texts

Aksamija, A. (2017) *Integrating innovation in architecture : design, methods and technology for progressive practice and research,* John Wiley & Sons, Hoboken, New Jersey, Stati Uniti
Allen, E. Iano, J. (2014) *Fundamentals of Building Construction: Materials and Methods,* John Wiley & Sons, Hoboken, New Jersey, Stati Uniti
Deplazes, A. (2018) *Constructing architecture: materials, processes, structures a handbook,* Birkhäuser, Basel
Emmitt, S. (2012) *Architectural technology,* John Wiley & Sons, Wiley-Blackwell, Hoboken, New Jersey, Stati Uniti
Herzog, T. et al. (2017) *Facade Construction Manual*, DETAIL Business Information GmbH, Munich
Hoffmann, H. W. (2016) *Museum buildings: construction and design manual,* Berlin: DOM
Lyons, A. (2014) *Materials for Architects and Builders,* Routledge, London
Peck, M. (Eds.) (2014) *Modern Concrete Construction Manual*, GmbH & Co. KG, Munich
Pell, B. (2010) *The articulate surface: ornament and technology in contemporary architecture*, Birkhäuser, Basel
Rangel, B. et al. (Eds.) (2019) *Museum Technology and Architecture,* Building Research: Design, Construction and Technologies, Springer Nature Switzerlnd AG
Silver, P. McLean, W. (2013) *Introduction to architectural technology,* Laurence King Publishong, London
Staib, G. Dörrhöfer, A. Rosenthal, M. Anderle-Neill, C. (2008) *Components and systems: modular construction; design, structure, new technologies*, Birkhäuser, Basel
Watt, A. (2016) *Modern Construction Case Studies: Emerging Innovation in Building Techniques*, Birkhäuser, Basel