COURSE: **TECNOLOGY & ARCHITECTURE**			
ACADEMIC YEAR: **2017/2018**			
TYPE OF EDUCATIONAL ACTIVITY: **(C) Affine**			
TEACHER: **Francesco P. R. MARINO**			
e-mail: francesco.marino@unibas.it		web: https://elearning.unibas.it/	
phone: 0971.205176		mobile (optional): ---	
Language: **Italian**			
ECTS: **9**	n. of hours: **48 Lessons** **33 Tutorials** **81 Total**	Campus: **Potenza** Dept./School: **Engineering** Program: **Magistral Course structure diagram in Civil Engineering – curriculum Structural-Construction Engineering (ISE)**	Semester: **I and II (annual)**

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The Course aims to contribute to form designers who know design and building methods used in buildings middle-high performing in Europe and other industrialized countries, being able of evaluating implications of choices both on formal domain, and in feasibility, and in economic domain too. On the basis of the *requirement-performance* methodology approach, the course intends to improve and deepen the knowledge of this methodology, in particular through the discussion of exemplaes particularly relevant from the architectural point of view, to understand how the definition can be reached in projects of high complexity in connection with the environment.

The disciplinary content of the course covers the theories, tools and methods of experimental architecture at different scales, based on the evolution of settlements, constructive and environmental design, and the techniques of transformation and maintenance of the built environment. They include the history and the technological culture of design; the study of the natural and artificial materials; environmental design, elements and systems; engineering, construction, transformation and maintenance technologies; innovation process and organization of building production; demanding dynamics, performance aspects, and quality controls.

Knowledge and understanding: The course provides students with a wealth of systematized information on the problems inherent in the realization of a building, with particular reference to the relationship between design and execution time.

Ability to apply knowledge and understanding: Students will have to demonstrate knowing and learning the systems and construction techniques, components and industrial construction products and assemblies in use. They will also gain awareness of the design of architecture as a "design process", characterized by sequences, operator roles, and methodologies.

Autonomy of judgment: The didactic approach provides that theoretical training is accompanied by individual work, which encourages active participation, propositional attitudes and self-elaboration skills.

Communicative skills: Preparation and presentation of a technical relationship is planned to develop both written and oral communication skills during the course. The student must be able to explain in a simple way to unskilled persons and to use the scientific language correctly, to design activity carried out. Verification of learning also includes oral talks during revisions of the elaborated design in which the ability to express, correct, clear, and concise constitute a primary judgmental element. The final exam offers the students a further opportunity to test the processing skills and communication of the work they are doing.

Learning abilities: Learning abilities are verified throughout the course, using methodologies based on the analysis and the resolution of complex and interdisciplinary problems as well as on group discussion. The student must

progressively become independent from the teacher and the teaching aids provided during the frontal lessons, acquiring the ability to refine and deepen his / her knowledge by consulting texts and publications on specific topics covered in the course.

PRE-REQUIREMENTS

It is necessary to acquire and assimilate the knowledge of the fundamental concepts of Materials Technology and Building Materials, Static, Strength of Materials.

SYLLABUS

Performance design of building system. Environmental and technological systems. Performance-based and descriptive-based standards. Quality in building. Principal rules for design of public works in Italy. Law n.109/1994 and DPR n. 554/1999. D.Lgs. n. 163/2006, DPR n. 207/2010 and D.Lgs. n. 50/2016. D.Lgs. n. 81/2008. Fundamentals: modular design, design with modular components; natural and artificial materials; the building and the environment; sustainability and free resoures for warming and for cooling; design for the winter and/or for the summer; watertighness of building casings; acoustic insulation and acoustics of the spaces; thermal and hygrometrical conditions of the spaces and of the building casings; thermal inertia, attenuation and phase shift; natural ventilation; natural lighting, daylight factor; plant integration, mechanical controlled ventilation; fire protection; anti-seismic design. Coherence v/s dissociation between structure and form: the arranged-in-layers casing, buildings *shell and core*, massive buildings, dry stratified buildings. Bearing masonry buildings today: masonry of little elements, in situ reinforced concrete walls made with industrial formworks, great load-bearing precast panels, precast tree-dimensional cellules, wood structures, massive, platform, with X-LAM panels. Pillar-beam frame buildings today: in situ or precast, in reinforced concrete, in steel, in wood and glulam elements. “Mediterranean”architecture and cold countries architecture. Multi-layer walls, blind and transparent (DSF), with high thermal efficiency. “Passive houses”. Contact with ground and bermed buildings. Floors today. Coverings and their new roles. To remove barriers to mobility. Balconies and loggias. Pathology prevention and maintenance design. To add active energy production plants from local renewable sources: thermal solar, mini-eolic, photovoltaic, geotermic, mini-hydraulic, hydrogen-based, for designing of Nearly Zero Energy Buildings.

TEACHING METHODS

Theoretical lessons (48 hours), classroom and laboratory (at *La.Te.C.* - Laboratory of Building Technology) tutorials and guided design exercises (33 hours).

EVALUATION METHODS

Intermediate verifications, Discussion of a project work, Oral examination.
The aim of the examination is to verify the level of achievement of the goals indicated above. The positive evaluation of intermediate tests (n. 3) and guided design exercise, developed during the course, are precondition for the access to the oral examination. The exam consists in the overcoming of an oral examination, during which the ability to connect and compare the different aspects covered during the course will be evaluated, with reference to bibliography support, and the discussion of the elaborates produced by the student in the project design exercise. The overall assessment will also consider the level of maturity reached in the project work. This overall evaluation will be weighed by the number of 9 cfu of the integrated course "*Recovery and Renovation Design + Technology & Architecture*" (15 cfu).

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- Reference textbooks:

ARNOLD CHRISTOPHER, REITHERMAN ROBERT, *Building Configuration and Seismic Design*, New York, Wiley-Interscience Publication, 1982; LEMBO, FILIBERTO (a cura di), *Isolare dall'esterno*, 2 Voll., Faenza, Faenza Editrice SpA, 1990; VITTONE, RENE', *Batir – manuel de la construction*, Lausanne, Presses Polytéchniques et Universitaires Romandes, 1996; LEVY, MATTYS, SALVADORI, MARIO, Perché gli edifici cadono, Ed. Bompiani, Milano 1997; LEMBO FILIBERTO, MARINO FRANCESCO P.R., *Il comportamento nel tempo degli edifici – cause di degrado e soluzioni progettuali dei sistemi "tradizionali" ed "industrializzati" – Casi di studio*, Roma, Ed. EPC Libri, 2002; Torricelli M.C., Del Nord R., Felli P., *Materiali e tecnologie dell'architettura*, Editore Laterza, Bari 2004; MARINO FRANCESCO P.R., GRIECO MARIA TERESA, *La certificazione energetica degli edifici ed il D.Lgs. 192 del 19/8/2005 – Algoritmi di calcolo ed esperienze internazionali*, IV^ Edizione, Roma, Ed. EPC Libri, 2006; SCHITTICH, CHRISTIAN (a cura di), *Cost-Effective Building – Economic concepts and constructions*, Munchen, Editions Détail, 2007; GROSSO, MARIO, *Il raffrescamento passivo degli edifici*, Maggioli Editore, Rimini, 2017.

- For further information, the following texts (made available by the teacher) can be utilized:

AA.VV. *Recupero Edilizio*, 7 volumi, Ed. Ente Autonomo Fiere di Bologna, 1982; FONTANA, CARLOTTA, *Recuperare - le parole e le cose*, Ed. ALINEA, Firenze, 1991; DORAN, DAVID K. (a cura di), *Construction Materials Reference Book*, Oxford, Butterworth-Heinemann Ltd, 1992; Ed. WEKA, *Détails des projets de construction de batiments*, Ed. WEKA, Paris, 1993; DUTHU, HENRI, *La Téchnique du batiment-tous corps d' état*, Paris, Le Moniteur, 1994; ZAMBELLI ETTORE ed altri, *Costruzione stratificata a secco - tecnologie edilizie innovative e metodi per la gestione del progetto*, Maggioli Editore, Rimini, 1998; GURRIERI, FRANCESCO (a cura di), *Manuale per la riabilitazione e la ricostruzione post-sismica degli edifici - Regione dell' Umbria*, Ed. DEI, Roma, 1999; LUCCHINI, ANGELO, *Le pareti ventilate*, Ed. Il Sole-24 ore, Milano 2000; LUCCHINI, ANGELO, *Le coperture innovative - soluzioni progettuali e costruttive*, Ed. Il Sole-24 ore, Milano 2000; CSTB, Recueil des Elements utiles à l'Etablissement des projets en France - REEF.

Journal magazines: Cahiers du CSTB, CSTB Magazine, Détail, The Architect's Journal, AU, Recuperare, Acciaio, L'Industria Italiana del Cemento.

- Course notes provided by the teacher and made available also on electronic support.
- Online teaching materials at the URL:
  https://www.dropbox.com/sh/odhuyighdyw885u/AACWQMN__BMcfOABq3vo7XMUa?dl=0

INTERACTION WITH STUDENTS

At the beginning of the course, after describing objectives, program and verification methods, the teacher makes the teaching material available to the students (shared dropbox folders, website, etc). At the same time, he collects the list of students that intend to enroll in the course, including their name, surname, student number, email and telephone number.

Reception hours: Monday and Tuesday from 5 pm to 7 pm at: Engineering School (IV floor, room 64). In addition to the weekly reception time, the teacher is always available after appointment, immediately after each lesson and through his e-mail.

EXAMINATION SESSIONS (FORECAST)[1]

At least one appeal per month will be guaranteed, presumably on days: 05/06/2018, 19/06/2018, 03/07/2018, 17/07/2018, 11/09/2018, 25/09/2018.

SEMINARS BY EXTERNAL EXPERTS YES X NO □

FURTHER INFORMATION

The frequency requirements of teaching activities are met by "office" at the end of each semester in which they are placed.

[1] Subject to possible changes: check the web site of the Teacher or the Department/School for updates.