

1. COURSE

AR1D2. Design Studio II (Mandatory)

2. GENERAL INFORMATION

2.1 Course	: AR1D2. Design Studio II
2.2 Semester	: 2 nd Semester.
2.3 Credits	: 4
2.4 Hours	: 4 HT; 4 HP;
2.5 Duration of the period	: 16 weeks
2.6 Type of course	: Mandatory
2.7 Learning modality	: Face to face
2.8 Prerequisites	: AR1D1. Design Studio I. (1 st Sem)

3. PROFESSORS

Meetings after coordination with the professor

4. INTRODUCTION TO THE COURSE

Design Studio II: Single-Family Housing is the student's first complete, habitable design project, building on the spatial, formal, and representational foundations developed in Design Studio I (AR1D1, prerequisite). Students design a single-family house on a real lot, resolving a full domestic program – living, sleeping, service, and outdoor spaces – while responding to accessibility requirements, daylight and thermal comfort, and the specific conditions of the site. The studio introduces the residential structural systems – confined masonry, timber framing, and reinforced adobe – most commonly used to build a single-family house in Peru. It continues the pin-up/desk-crit critique culture and introduces the communication skills (design boards, physical models, verbal presentation) needed to defend a complete design proposal. This course is the foundation for Design Studio III (AR1D3).

5. GOALS

- Apply human-centered and universal design principles – including accessibility standards – to the design of a complete domestic program on a real lot.
- Resolve the functional, spatial, and site-responsive requirements of single-family housing, from zoning diagrams to a developed floor plan.
- Design building apertures and envelope strategies that provide adequate daylight and passive thermal comfort for the dwelling.
- Select and detail an appropriate residential structural system – confined masonry, timber framing, or reinforced adobe – for the house, considering material availability, cost, and seismic performance.
- Iterate the design proposal through a full studio critique cycle and communicate the final design through boards, models, and verbal presentation.

6. COMPETENCES

AG-A04) Communicates effectively and inclusively with the architecture community and society through reports, design documentation, and presentations tailored to different audiences. (Usage)

AG-A08) Understands the structural and environmental design problems associated with construction and the engineering of building design. (Usage)

AG-A11) Demonstrates knowledge of the physical problems and technologies that allow buildings to provide internal comfort and protection within environmental parameters. (Usage)

AG-A15) Understands the relationship between people, buildings, and their environment, and the need to relate buildings and spaces to human scale and needs. (Usage)

7. TOPICS

Unit 1: Human-Centered and Inclusive Design (8 hours)	
Competences Expected: AG-A15	
Topics	Learning Outcomes
• Universal design principles: equitable use, flexibility in use, simple and intuitive operation, perceptible information, tolerance for error, low physical effort, and size • Accessibility standards and codes: ADA, ISO 21542, and regional building codes for accessible routes, ramps, elevators, restrooms, signage, and emergency egress • Spatial user experience: wayfinding, legibility, sensory richness, acoustic comfort, and the design of spaces that support diverse activities, ages, and abilities • Participatory design processes: engaging future users and communities in defining spatial needs; co-design workshops, interviews, and community mapping as design tools	• Describe the principles of universal design and inclusive architecture and explain how they translate into spatial and technical design decisions [Familiarity] • Apply universal design principles and accessibility standards to develop an architectural design that accommodates the full spectrum of human ability, age, and cultural background [Usage] • Evaluate a building or public space design for inclusivity and accessibility, identifying barriers and proposing design modifications to improve equity and user experience [Assessment]
Readings : [Neufert2012]	

Unit 2: Residential and Vernacular Structural Systems (8 hours)	
Competences Expected: AG-A08	
Topics	Learning Outcomes
• Confined masonry (albañilería confinada): masonry walls confined by cast-in-place reinforced-concrete tie-columns and tie-beams, its seismic behavior and failure modes, and its role as Peru's dominant residential construction system under RNE Norma E.070 • Timber structural systems: heavy-timber post-and-beam framing, light wood framing (platform framing), mass timber (CLT, glulam), and the connections that distinguish each system's load path and seismic behavior • Reinforced and improved adobe (adobe mejorado): seismic retrofitting of earthen walls with geogrid/geomesh, cane (caña), or wire mesh reinforcement to mitigate the brittle failure of plain adobe, per Peru's RNE Norma E.080	• Identify confined masonry, timber, and reinforced earthen construction as structural systems, and describe their seismic behavior, failure modes, and appropriate use contexts [Familiarity] • Select and detail an appropriate residential structural system - confined masonry, timber framing, or reinforced adobe - for a single-family house, considering material availability, cost, and seismic performance [Usage] • Evaluate a single-family house's structural system for seismic adequacy and constructability, identifying code-compliance gaps under RNE Norma E.070 or E.080 as applicable [Assessment]
Readings : [FriedmanHousing2013]	

Unit 3: Housing and Residential Environments (12 hours)	
Competences Expected: AG-A15	
Topics	Learning Outcomes
- Housing typologies: single-family detached, row house, courtyard building, walk-up apartment, point tower, slab block, double-loaded corridor, - Affordable housing strategies: inclusionary zoning, density bonuses, cross-subsidization, public-private partnerships, community land trusts (CLTs), and the financial - Housing quality and dweller control: orientation for sunlight and ventilation, unit depth to window ratio, privacy thresholds (distance to opposite windows), acoustic separation - Mixed-income and social mix housing: fostering social interaction, avoiding stigma of large public housing projects (Pruitt-Igoe lessons), - Housing policy frameworks: Vienna's social housing model, Singapore's public housing, Chilean housing subsidies,	- Identify the principal housing typologies and their urban density contributions, and describe the design qualities that distinguish high-quality residential environments from poorly designed ones [Familiarity] - Design a housing block at the neighborhood scale, specifying building typology mix, dwelling unit orientation and ventilation strategy, [Usage] - Evaluate a housing project for quality of life, affordability, and urban integration, using indicators such as floor-to-ceiling height, access to light [Assessment]
Readings : [Neufert2012], [FriedmanHousing2013]	

Unit 4: Daylighting and Visual Comfort (8 hours)	
Competences Expected: AG-A11	
Topics	Learning Outcomes
- Daylight performance metrics: daylight factor (DF), spatial daylight autonomy (sDA), annual sunlight exposure (ASE), useful daylight illuminance (UDI), and glare indices (DGP, DGI) - Aperture design for daylight: window-to-wall ratio (WWR), head height, sill height, clerestories, saw-tooth roofs, light shelves, - Shading integration for glare and cooling: fixed (overhangs, fins, louvers), operable (roller shades, venetian blinds, screens), - Daylight simulation tools: climate-based modeling (Radiance, DIVA, ClimateStudio, Ladybug Tools); annual simulation for LEED and other certification credits - Electric lighting integration: daylight harvesting controls (dimming, stepped switching), task-ambient lighting strategies,	- Describe the principal daylight performance metrics (sDA, ASE, UDI) and explain how they inform aperture and shading design decisions [Familiarity] - Design and simulate a daylighting strategy for a building facade or roof aperture, iterating on WWR, orientation, and shading to meet defined sDA and ASE targets [Usage] - Evaluate a building's daylighting design from simulation outputs, identifying areas of glare or insufficient illuminance [Assessment]
Readings : [BrownDeKay2001]	

Unit 5: Thermal Comfort and Passive Systems (8 hours)	
Competences Expected: AG-A11	
Topics	Learning Outcomes
• Heat transfer mechanisms in buildings: conduction through assemblies (U-value), convection at surfaces and within cavities, and long-wave • Thermal comfort indices: PMV (predicted mean vote), PPD (predicted percentage dissatisfied), operative temperature, • Passive solar heating: direct gain (south-facing glazing + thermal mass), indirect gain (Trombe wall, water wall), isolated gain (sunspace) • Passive cooling strategies: night-flush ventilation, radiative cooling to the night sky, earth coupling (earth tubes, berming), evaporative cooling (roof ponds, fountains), • Thermal mass strategies: phase change materials (PCMs), exposed concrete or masonry for diurnal heat storage, and the placement of mass relative to insulation and solar gains	• Describe the heat transfer mechanisms that affect building thermal performance and explain the difference between predicted mean vote (PMV) and adaptive thermal comfort models [Familiarity] • Select and apply appropriate passive heating and cooling strategies for a building in a given climate, sizing apertures and mass to reduce predicted heating and cooling loads [Usage] • Evaluate a building's thermal design using simulation or hand calculation, identifying strategies that are underperforming [Assessment]
Readings : [BrownDeKay2001]	

Unit 6: Design Process and Creative Methods (10 hours)	
Competences Expected: AG-A04	
Topics	Learning Outcomes
• Brief analysis and problem framing: decomposing a design brief into spatial, functional, contextual, and performative requirements; identifying constraints and opportunities • Architectural site analysis: solar orientation and sun path, prevailing wind and microclimate, topography and drainage, views and visual axes, vehicular and pedestrian access, surrounding urban fabric and context, and existing site constraints (easements, setbacks, utilities) as inputs to a design concept • Design-criteria formulation: translating client and user requirements, site-analysis findings, and regulatory constraints into a prioritized, measurable set of functional, spatial, environmental, and budgetary criteria used to generate and evaluate design alternatives • Ideation and concept development: sketching, diagramming, and collage as tools to explore spatial ideas; arriving at the parti (partido arquitectónico) – the single organizing idea that drives a design – and translating it into spatial and formal proposals • Physical model-making as a design tool: study models for spatial exploration, massing studies, sectional models, and the role of making in discovering design solutions • Iterative design and critique: pin-up and desk critique culture, receiving and integrating feedback, revision cycles, and developing design judgment through reflection • Design narrative and argumentation: articulating design intent verbally and graphically, building a coherent design argument, and presenting spatial proposals persuasively • Collaborative and interdisciplinary design processes: co-design with engineers, landscape architects, and community stakeholders	• Describe the stages of an iterative architectural design process, from brief and site analysis through design-criteria formulation, concept development (parti), revision, and final proposal [Familiarity] • Apply site analysis, design-criteria formulation, and systematic ideation and iterative critique methods to develop and refine a spatial architectural proposal in response to a design brief [Usage] • Evaluate the coherence and effectiveness of a design process, including the quality of concept articulation, iteration, and responsiveness to critique [Assessment]
Readings : [Lawson2005]	

Unit 7: Architectural Communication and Presentation (8 hours)	
Competences Expected: AG-A04	
Topics	Learning Outcomes
• Design boards and panels: composition principles (grid, hierarchy, contrast, white space), integrating drawings (plan, section, elevation, axonometric, perspective), renderings • Architectural portfolio design: project selection (range of scales, stages, typologies), portfolio structure, narrative, captioning, • Physical model presentation: material choices (cardboard, foam, acrylic, 3D-printed, laser-cut), scale selection, level of detail, lighting • Verbal presentation of design: structuring a 5-10 minute design pitch (problem, concept, proposal, testing, conclusion), visual aids, responding to critique, • Architectural diagramming: circulation, program, structure, environmental performance, form generation, process	• Describe the key elements of effective architectural communication: narrative structure, visual hierarchy, appropriate level of detail, [Familiarity] • Produce a design presentation board (single panel) for an architectural project that integrates orthographic drawings, rendered views, diagrams, [Usage] • Evaluate a design portfolio or presentation for its communicative effectiveness, identifying strengths in narrative and visual clarity [Assessment]
Readings : [ChingGraphics2014]	

8. WORKPLAN

8.1 Methodology

Individual and team participation is encouraged to present their ideas, motivating them with additional points in the different stages of the course evaluation.

8.2 Theory Sessions

The theory sessions are held in master classes with activities including active learning and roleplay to allow students to internalize the concepts.

8.3 Practical Sessions

The practical sessions are held in class where a series of exercises and/or practical concepts are developed through problem solving, problem solving, specific exercises and/or in application contexts.

9. EVALUATION SYSTEM

***** EVALUATION MISSING *****

10. BASIC BIBLIOGRAPHY