Private University of Tacna (UPT)
School of Architecture
Syllabus 2027-I

1. COURSE

AR2R1. Digital Drafting (Mandatory)

2. GENERAL INFORMATION

2.1 Course	:	AR2R1. Digital Drafting
2.2 Semester	:	2nd Semester.
2.3 Credits	:	4
2.4 Hours	:	2 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 Prerrequisites	:	AR1R1. Geometry and Analog Drawing. (1st Sem)

3. PROFESSORS

Meetings after coordination with the professor

4. INTRODUCTION TO THE COURSE

Digital Drafting is the second step of the Representation sequence, building directly on the orthogonal-projection and drafting-convention foundations from Geometry and Analog Drawing I (ARC1R1) and translating them into professional CAD/BIM software (Civil 3D, BricsCAD BIM). It introduces layer management, parametric/visual scripting, and generative-AI-assisted ideation – the production pipeline every later urbanism studio and the Topography course (ARC1T1) will assume students already have. Dedicated BIM authoring is left to the BIM course sequence (AR1B1 onward), which this course precedes.

5. GOALS

- Produce coordinated, layer-managed 2D technical drawings in CAD software for urban infrastructure, lots, and public-space plans.
- Build basic parametric/visual-scripting workflows to generate design variants of recurrent urban components (street sections, lot layouts).
- Use generative-AI tools for early-stage design ideation and image refinement, critically assessing their dimensional accuracy and authorship limitations against CAD-authored drawings.

6. COMPETENCES

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

AG-A06) Recognizes the need to learn independently and continuously, adapt to new and emerging technologies, and apply critical thinking in the face of technological change. (Assessment)

7. TOPICS

Unit 1: Computer-Aided Drafting (CAD) (32 hours)	
Competences Expected: AG-A04	
Topics	**Learning Outcomes**
• Digital 2D drafting in CAD software: layer organization and naming conventions (AIA CAD Layer Guidelines, US National CAD Standard), line types and line weights managed by layer, blocks and symbols as reusable CAD objects, external references (Xrefs) for coordinating consultant drawings, and plotting and sheet setup	• Identify the core conventions of digital 2D CAD drafting - layer organization, line types, blocks, and external references - and describe how they differ from hand-drafting conventions [Familiarity] • Produce a set of 2D CAD drawings for a small building using organized layers, blocks, and a consistent plotting and sheet setup [Usage] • Evaluate a set of CAD drawings for layer organization, line-type consistency, and block usage, identifying errors that would complicate plotting or consultant coordination [Assessment]
Readings : [Omu22]	

Unit 2: Parametric Design and Visual Programming (32 hours)	
Competences Expected: AG-A06	
Topics	**Learning Outcomes**
• Associative (parametric) modeling: defining geometry through relationships and rules rather than fixed coordinates; data flow graphs (inputs, components, outputs) • Data types in parametric models: numbers (integers, floats), points, vectors, curves, surfaces, breps, lists, data trees (graft, flatten, simplify), • Attractors and fields: using point attractors, curve attractors, or image sampling to modulate geometric parameters (size, rotation, density, offset) across a field • Parametric design families: creating a parameterized component (window, shading louver, structural node) whose geometry updates when driving dimensions or external data changes • Integrating external data: reading data from CSV/Excel files to drive geometry (site sun hours, program areas, cost data)	• Describe the principles of associative parametric modeling and explain the role of data trees, attractors, and external data in generating geometric variation [Familiarity] • Develop a parametric definition for a building facade panel system or structural grid that varies by orientation or solar exposure [Usage] • Evaluate a parametric definition for efficiency and clarity, identifying unnecessary components, redundant data structures, and opportunities for simplification or documentation [Assessment]
Readings : [Dav15]	

Unit 3: Generative AI for Architectural Design (32 hours)	
Competences Expected: AG-A06	
Topics	**Learning Outcomes**
• Text-to-image generation for design ideation: prompt engineering (style descriptors, architectural typologies, atmospheric qualities), iterative refinement, • Image-to-image and inpainting: using sketches or massing models as input for AI refinement (style transfer, detail generation) • Emerging text-to-3D generation: generating 3D models (mesh, point cloud, NeRF) from text or image prompts • Integrating generative AI into architectural workflows: early concept generation, client mood boards, presentation image enhancement (style transfer, background replacement • Limitations and risks of generative AI in architecture: lack of dimensional accuracy, non-constructible details, copyright	• Describe the capabilities and limitations of generative AI (text-to-image, image-to-image, text-to-3D) for architectural design ideation and visual communication [Familiarity] • Use a text-to-image AI tool to generate a set of conceptual design variations for an architectural project, then refine the best variation through image-to-image inpainting [Usage] • Evaluate AI-generated design images for their applicability to a real design problem, distinguishing inspirational material from constructible design content, [Assessment]
Readings : [CM22]	

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

[Dav15] Scott Davidson. *Grasshopper: Visual Scripting for Rhinoceros 3D*. 1st. self-published / McNeel, 2015.

[CM22] Matias del Campo and Sandra Manninger. *Neural Architecture: Design and Artificial Intelligence*. 1st. ORO Editions, 2022.

[Omu22] George Omura. *Mastering AutoCAD Civil 3D*. 1st. Sybex, 2022.