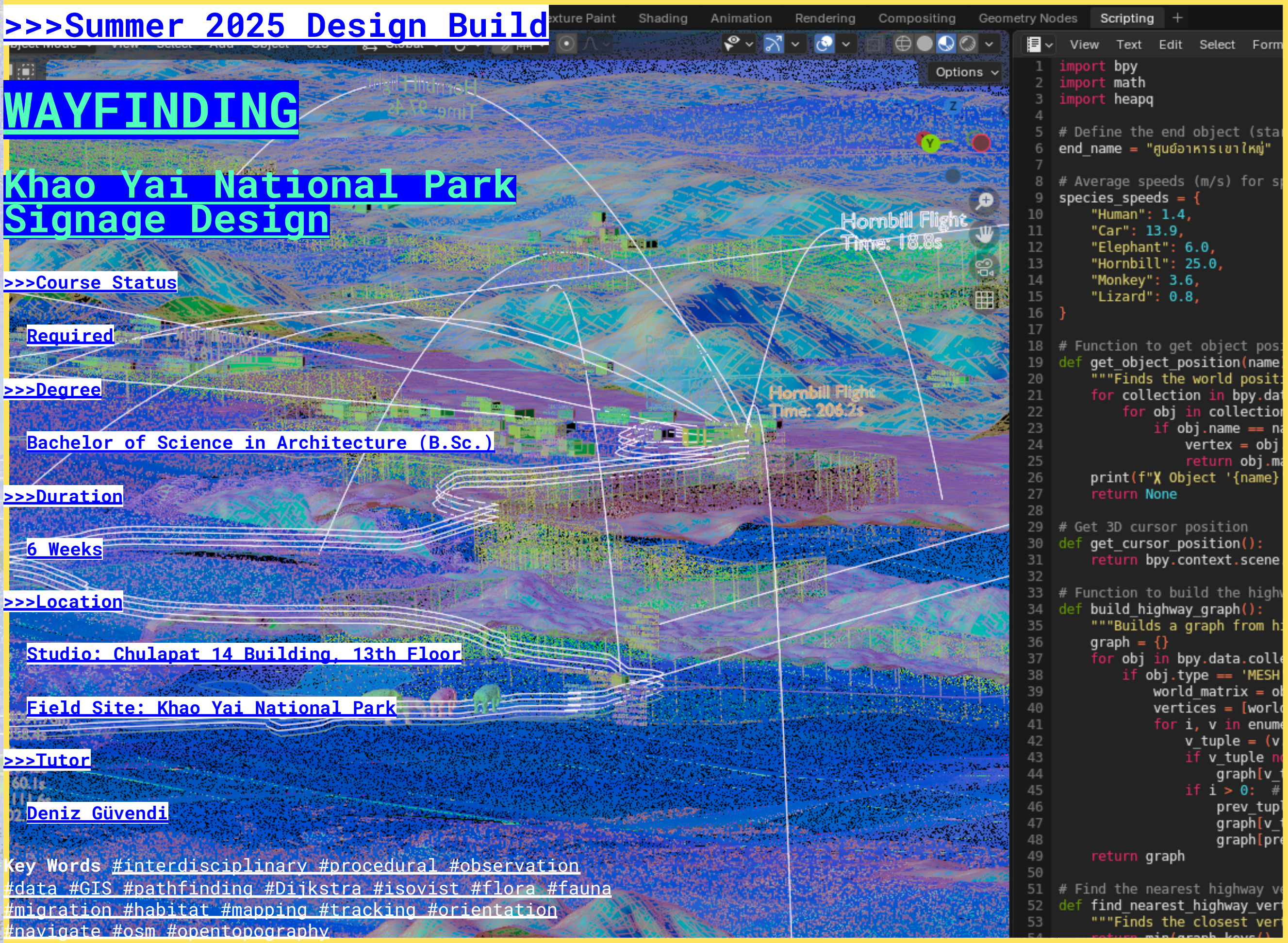

>>>Summer 2025 Design Build

WAYFINDING

Khao Yai National Park Signage Design

>>>Course Status

Required

>>>Degree

Bachelor of Science in Architecture (B.Sc.)

>>>Duration

6 Weeks

>>>Location

Studio: Chulapat 14 Building, 13th Floor

Field Site: Khao Yai National Park

>>>Tutor

Deniz Güvendi

Key Words #interdisciplinary #procedural #observation #data #GIS #pathfinding #Dijkstra #isovist #flora #fauna #migration #habitat #mapping #tracking #orientation #navigate #osm #opentopography

Course Description

"In the time of adaptation, architecture needs to draw on all forms of intelligence—natural, artificial, collective."
– Carlo Ratti, Venice Architecture Biennale 2025 Intelligens. Natural. Artificial. Collective.

Wayfinding is not just about navigation—it is a system that **orchestrates movement, clarity, and spatial experience**. As behaviors in navigation shift and environmental conditions change, signage must evolve into **an intelligent, adaptive, and context-aware system**. While digital navigation alters how we interact with spaces, **physical wayfinding remains critical**—shaping perception, guiding movement, and integrating into the material environment.

The course will explore wayfinding and signage for Khao Yai Park starting with **spatial analysis, behavioral mapping, and material optimization**, integrating **Blender GIS, Houdini,** and later **Rhinoceros** for a transition from **large-scale mapping to fabrication-ready signage**. The first half of the course establishes a **structured framework** for research, computational modeling, and environmental integration. The second half shifts towards **individualized workflows**, where **students develop their own strategies and fabrication approaches** within a collective system of navigation design.

Learning Objectives

>>> Develop an adaptive and analytical approach to wayfinding, integrating **spatial research, computational methods, and material efficiency**.

>>> Apply **pathfinding and material optimization algorithms**

>>> Design, fabricate, and implement signage prototypes that are **contextually integrated and**

data driven.

>>> **Use Blender GIS, Houdini, and Rhino** as a **sequential workflow**, transitioning from **data analysis to physical fabrication**. (Basic knowledge of Rhinoceros required)

>>> Learn the **workflow from conceptualization to fabrication and on-site installation**

Project Phases

The course is divided into **four phases**, leading from **research to 1:1 implementation**.

Phase 1: Research & Data Collection (Weeks 1-2)

GROUP WORK

>>> Conduct **field studies** to observe visitor behavior, ecological features, and existing signage.
>>> Collect **data** (textures, environmental patterns, spatial organization) and other useful tools ex. Photogrammetry tools.
>>> **Mapping terrain, movement flows, and ecological features using GIS datasets, OpenStreetMap, Google Maps, and OpenTopography.**

>>> **Analyzing user and non-human navigation patterns, capturing textures and spatial organization, and rebuilding.**

(1:2000/1:200)

Phase 2: Concept Development (Weeks 3-4)

GROUP & INDIVIDUAL

>>> **Signage inventory** group work > **Defining signage typologies, typography, and spatial positioning within the environment.**

>>> **Documenting and analyzing existing signage posts** to **assess material composition and reuse potential**.

>>> **Applying the Hungarian Algorithm** to **optimize material redistribution and reduce unnecessary interventions**.

>>> **Developing material-conscious design strategies**, aligning **wayfinding interventions with site-specific resources**.

>>> Select **individual themes** based on ecological and spatial observations.

>>> Develop **concept sketches, models, and visualizations**.
>>> Explore **material possibilities** that align with the context.
>>> Test **digital and physical prototypes** to refine design solutions. (1:50 / 1:5 / 1:1)

Phase 3: Fabrication & Materialization (Weeks 5-6)

INDIVIDUAL/MAX.2

>>> **Developing site-specific wayfinding concepts, integrating ecological considerations and adaptive navigation strategies.**

>>Prototyping (1:20/1:50)

>>> Preparing **fabrication-ready models and documentation**, ensuring precision in placement, material selection, and assembly.

>>> Deploying signage prototypes at strategic locations, testing and refining real-world user interactions.

>>> Produce **1:1 scale prototypes** /mixed techniques.

>>> Install the sign

>>> Conduct **visitor testing** (**Exhibition**) (1:1)

Schedule

Week		
Week 1 – Research & Data Collection	Course Introduction & Research Scope	
	Fieldwork Preparation: Assign research roles, equipment setup	
	Field Study Trip to Khao Yai	Collect data, analyze terrain, document existing signage
	Existing Signage Documentation	Assess material reuse

		potential
	GIS Data Processing	
	Pathfinding Algorithm Introduction	Dijkstra's shortest path & movement logic
	Navigation & Behavioral Analysis	Studying movement patterns
	Mapping Navigation Flows	Analyzing terrain constraints & visitor routes
	Preliminary Theme & Concept Development	Material intervention strategies
Week 2 – Data Analysis & Concept Development	Group Work – Signage Inventory	Phase 2-Introduction
	Finalizing GIS & Terrain Data	Houdini-based navigation simulations
	Hungarian Algorithm for Material Optimization	Upcycling signage material inventory
	Material Inventory Analysis	Evaluating available resources
	Typology, font selection, spatial positioning	
	Computational Design Refinement	Algorithm-driven placement adjustments
	Developing Wayfinding Signage	Integrating AI, GIS, and user behavior
	Group Review & Refinement	
Week 3 – Concept Refinement	Digital Prototypes	
	Environmental Adaptation Review	Adjusting signs to ecological context
	Digital Prototype Refinements	Ensuring visibility & material feasibility
	Hungarian	

	Algorithm for Material Redistribution	
	Signage Placement & Orientation Adjustments	Testing field effectiveness
	Font & Visual Communication Strategy	Legibility testing in context
	Algorithmic Placement Validation	Running spatial simulations
	Pre-Production Testing	Evaluating material efficiency
	Group Review & Refinement	Iteration of final strategies
Week 4 – Fabrication Planning & Refinement	Making Models	
	Refining Digital Prototypes	Adjustments before fabrication
	Signage Integration Testing	Preparing for real-world installation
	Assembly Feasibility Review	Assessing construction strategies
	Material Adaptation & Refinement	Ensuring structural stability
	Finalizing Site Placement Details	Precision adjustments
	Pre-Installation Preparation	Ensuring signage durability
	Weather-Resistance Testing	Ensuring longevity
	Final Documentation & Presentation Prep	Organizing research insights
Week 5 – 1:1 Scale Fabrication & Assembly	Fabrication	
	Signage Detail Refinement	Precision assembly checks
	Pre-Installation Testing	Final prototype review

	Structural Reinforcement & Assembly	Preparing for on-site conditions
	Final Adjustments Before Installation	Ensuring field compatibility
Week 6 – Installation, Testing & Final Review	**On-Site Installation**	
	User Interaction Documentation	Observing movement response
	Testing	Refinements based on real-world conditions
	Team Critique & Adjustments	Refining based on feedback
	Final Exhibition	Reviewing the project process
	Submission: Documentation	Presenting research & fabrication outcomes

Deliverables

>>> Documentation: Research Driven Design – Data analysis, ecological observations, and thematic studies. (1/2000 - 1/200)

>>> Design Proposal – Concept sketches, models, prototypes (1/200 - 1/20)

>>> Fabricated Prototype – 1:1 scale wayfinding sign exhibited.

>>>Final Presentation – Showcasing the design process, material experimentation, and environmental integration.

Evaluation Criteria

Research & Analysis (20%) – Depth of environmental understanding & data integration.
Design Development (20%) – Creativity, functionality, and contextual adaptation.
Fabrication & Implementation (40%) – Quality and durability of the prototype.
Documentation & Presentation (20%) – Clarity in conveying research, process, and final outcome.

Tools & Resources

Software: Rhinoceros 7/8, Houdini 20.5 Labs, Blender, GIS add-on, Python 3.12.
Materials: Timber, Steel, recycled metal, biodegradable composites, Concrete (determined per project).
Field Equipment: GPS devices, environmental sensors, cameras, and phones.

Budget

Given fabrication budget: **10,000–20,000 THB per student** -depending on material choices and fabrication complexity. Materials and Construction, Transportation, Delivery Service - Renting Equipment, Printing poster, and booklet are included in the budget/student.

References

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