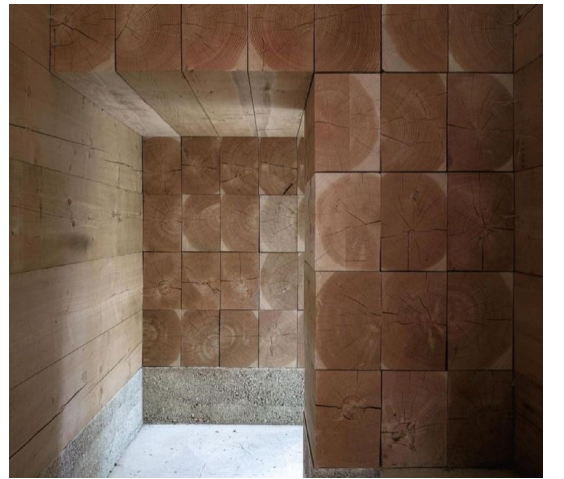


EARTH



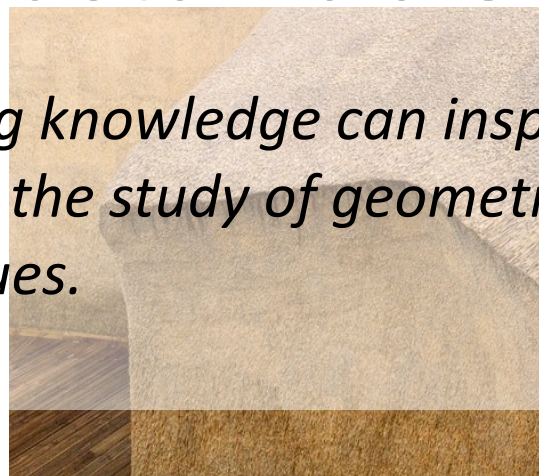
TIMBER



Bio-Sourced Materials From Vernacular to Sustainable Construction

Exploring how vernacular building knowledge can inspire contemporary sustainable construction through the study of geometry, materials, structural systems, and fabrication techniques.

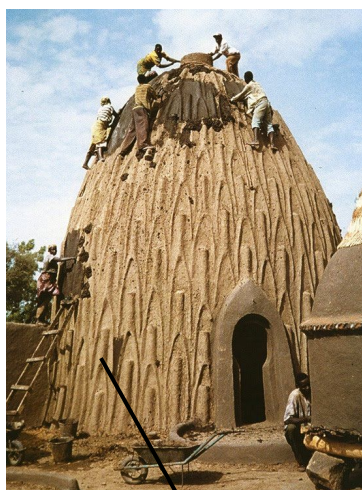
FIBERS



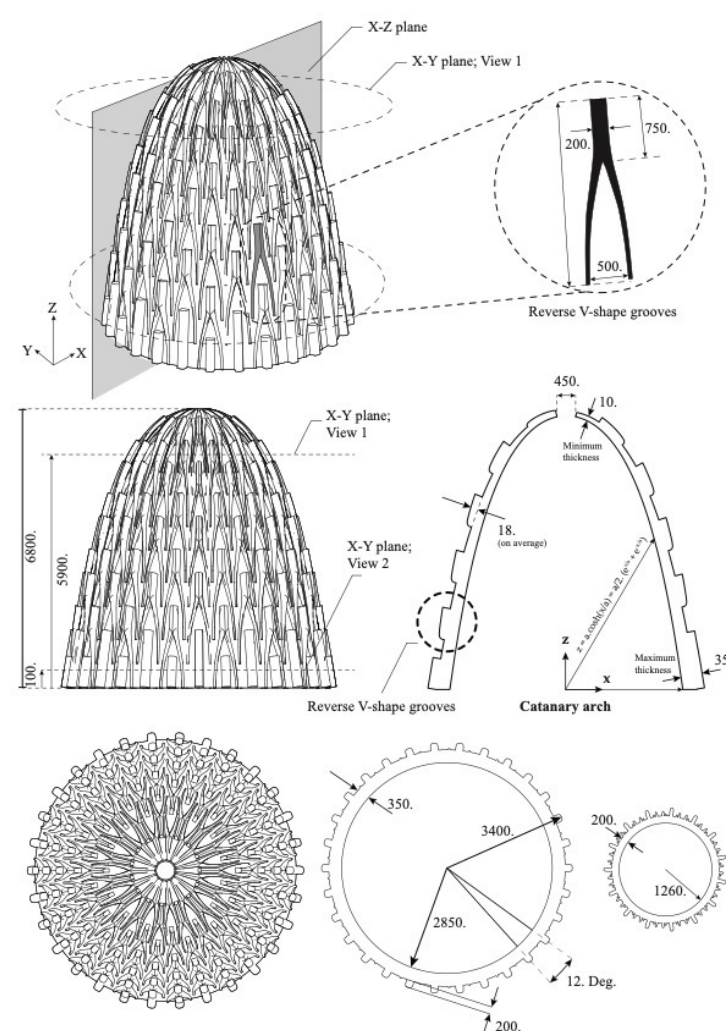


Rammed Earth, RicolaBuilding_H&M

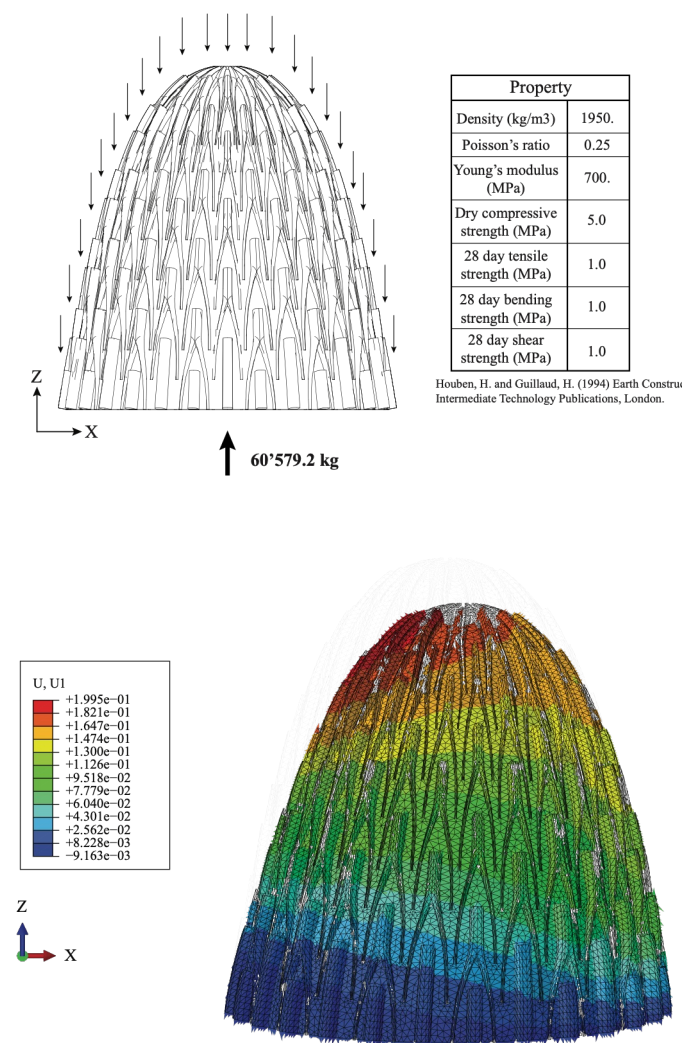
Vernacular architecture intuitively employs bio-based materials to create sophisticated spatial structures and construction techniques. This course explores the geometry, structural behavior, and construction logic of these buildings, revealing the principles that can inspire contemporary sustainable architecture.



Identification



Characterisation



Analyse

The course is organized into three complementary phases, guiding students from the understanding of bio-based materials to the design of innovative construction systems.

A. Foundations

Introduction to bio-based materials, vernacular architecture, and digital modeling through lectures and case studies, focusing on geometry, construction techniques, and structural principles.

B. Analysis

In-depth investigation of a vernacular construction, including its geometry, components, assembly methods, and structural behavior, supported by digital modeling and structural characterization.

C. Design

Development of an innovative bio-based construction system inspired by the analyzed precedent, integrating spatial design, construction logic, and assembly strategies.

W 1	W 2	W 3	W 4	W 5	W 6	W 7	W 8	W 9	W 10	W 11	W 12
- Biobased materials - Case Studies - Meshes and pattern - Rhino workshop		Weekly Exercises				Analysis Review	Weekly Exercises				Final Review



Topics Covered

Introduction to Bio-Based Construction Materials

Overview of major bio-based materials, their properties, and construction applications.

Earth-Based Construction Systems

Principles, techniques, and architectural applications of earthen materials.

Natural Fiber Construction

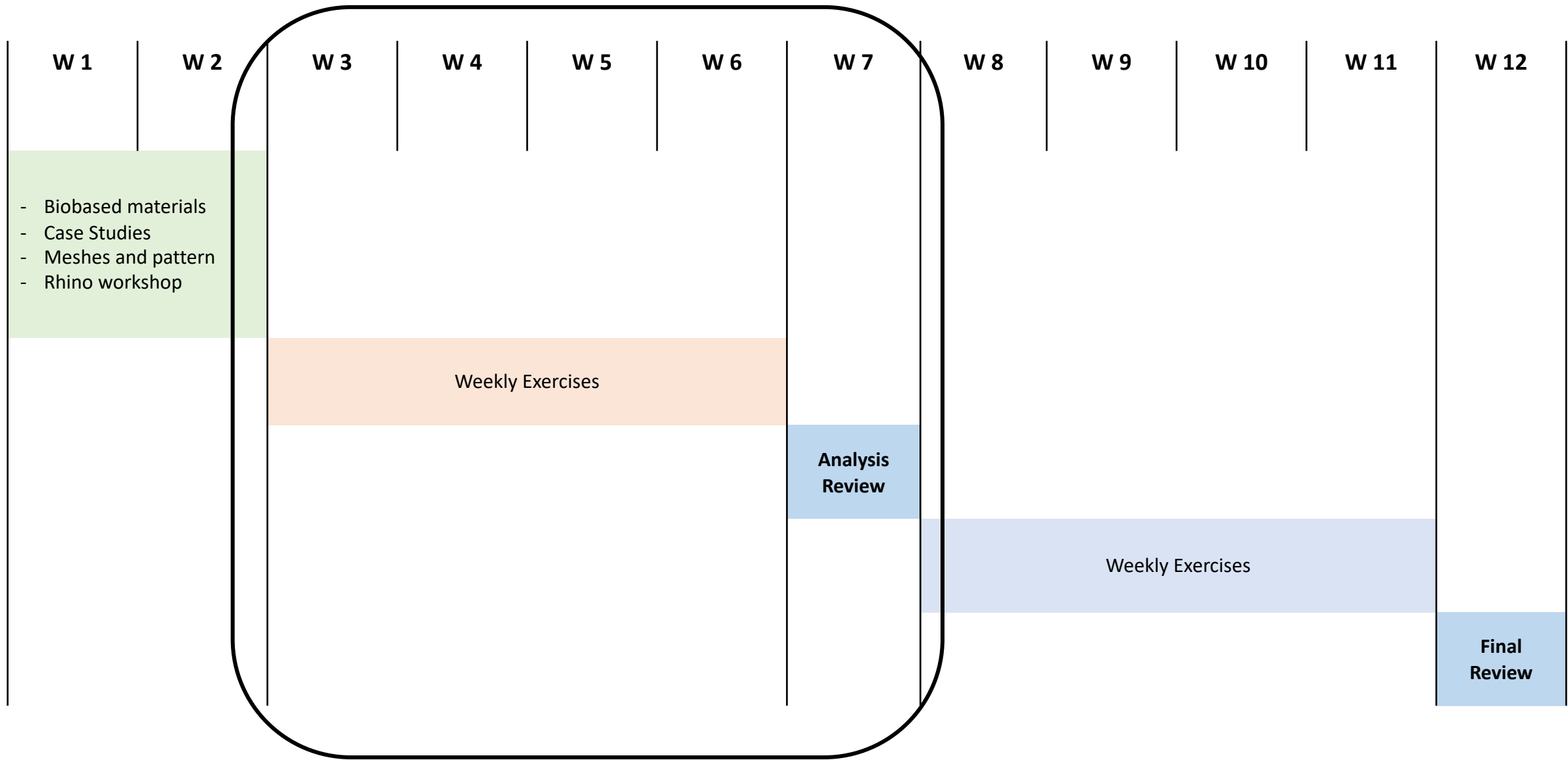
Building methods and structural applications using natural fiber materials.

Timber Construction

Construction principles, structural systems, and fabrication techniques for wood-based architecture.

Hybrid Bio-Based Systems

Design and construction strategies combining multiple bio-based materials into integrated building systems.



Musgum mud house
Cameroun



Omo Sebua House
Nia, Indonesia



Muddif House
Irak



Esfahk Mud Center
Iran



Madrier House
Cornelihus, Switzerland



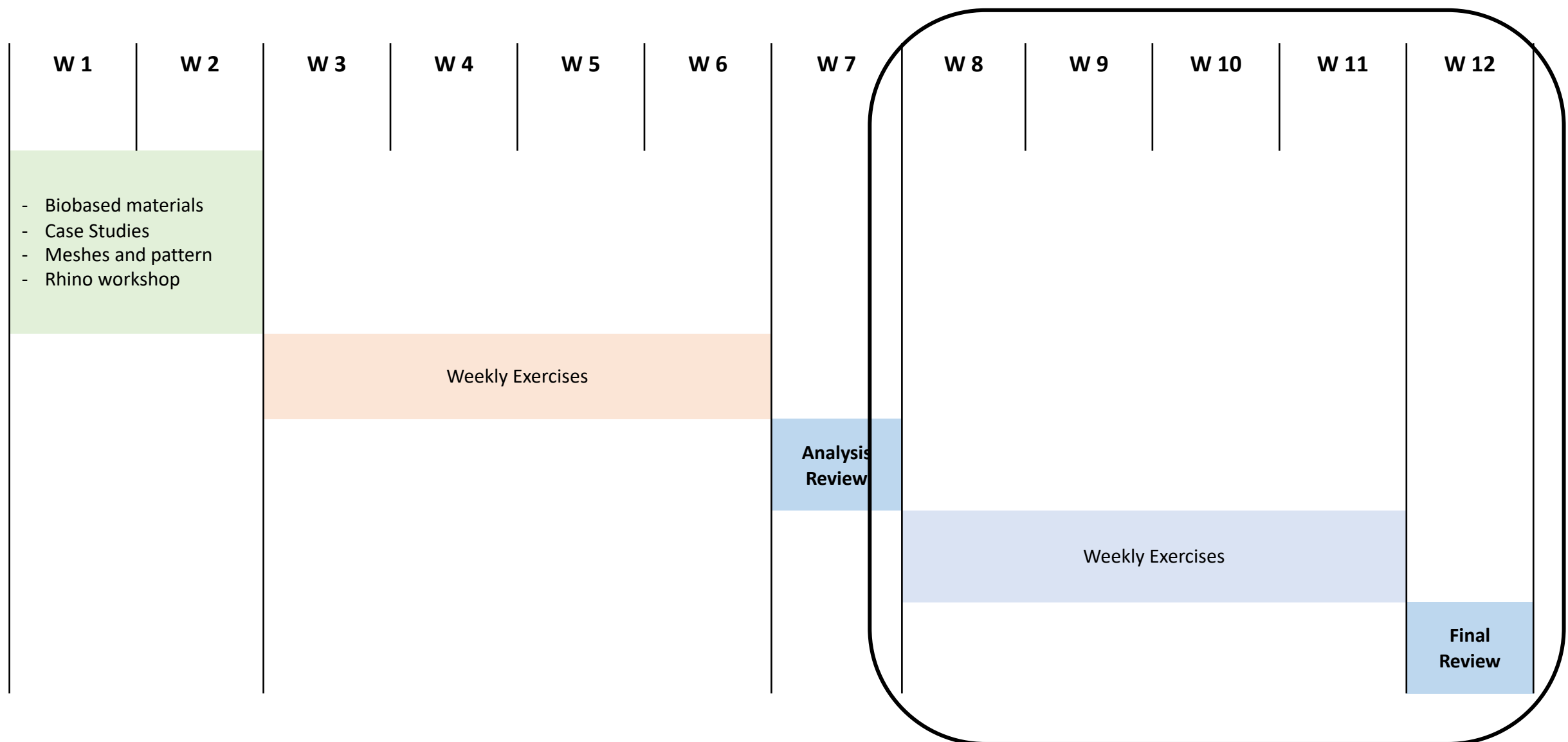
Kings Palace
Rwanda

Weekly analyse with specific thematics :

- Principles and identification of patterns (Overall geometry, etc.)
- Geometry and meshes (3D model, identification of components, mesh model)
- Details (identification of main nodes, scaled construction drawings, structural characterization)
- Structural analysis and assembly sequence (structural behavior, necessary assembly steps)
- Synthesis (report and presentation)

Deliverable

Each group will present their analysis during a 20min oral presentation.



Students develop a structural envelope with new architectural expression, directly derived from a radical and contemporary application of bio-based materials.

- Respect the overall geometric principles (form and proportions) of the case study
- Use exclusively bio-based materials for the new envelope
- Integrate the structural capacity of the envelope (self-supporting or load-bearing)
- Ensure water and airtightness
- Incorporate thermal insulation
- Form a coherent and braced structural system
- Develop an architectural expression derived from the materials and their specific methods of implementation

Deliverable

Each group will present their analysis during a 20min oral presentation.