

Living Lab Course Report

Course Period: January–May 2025 | Course: Environmental Sustainability & Climate Change | Model: Living Lab / Experiential Learning | Academic Context: Second Semester Curriculum | Coverage: Across all branches and schools of the University

SUMMARY

The Living Lab Course on Environmental Sustainability & Climate Change was conducted from January to May 2025 as part of the second-semester curriculum across all branches and schools of the University.

PROJECTS

Nature Photography Presentation | Connecting students with nature through observation and visual storytelling.
Group Discussions | Developing critical thinking and evidence-based reasoning on contemporary sustainability issues.

Panel Discussion on World Wetlands Day | Understanding wetlands, biodiversity, conservation and climate resilience.

Herbarium File Preparation | Exploring local biodiversity, plant taxonomy and ecological documentation.

Best Out of Waste | Promoting recycling, upcycling, creativity and circular-economy thinking.

Report on Environmental Issues | Building research, analytical writing and problem-solving capabilities.

AQI Indexing | Using real-time environmental data to understand air quality and pollution trends.

Environmental News Headlines & Collage | Strengthening media literacy and awareness of national and global environmental developments.

COURSE PHILOSOPHY

The Living Lab approach positioned the environment as a learning laboratory. Students were encouraged to connect classroom concepts with observations, data, community concerns and contemporary environmental developments. Learning cycle: OBSERVE → DISCUSS → INVESTIGATE → CREATE → REFLECT → ACT.

KEY OBJECTIVES

Develop awareness of environmental sustainability and climate change; connect theoretical concepts with real-world environmental situations; encourage students to observe and document local biodiversity; develop critical thinking through structured environmental debates; strengthen research, writing and analytical skills; introduce students to environmental data and air-quality monitoring; promote creativity through recycling and upcycling activities; develop communication, teamwork and presentation skills; improve awareness of environmental policies and global developments; foster ecological responsibility and sustainability-oriented citizenship.

LEARNING IMPACT FRAMEWORK

Knowledge: climate change, biodiversity, pollution, wetlands, waste management, environmental policies and sustainability. Skills: research, data interpretation, communication, presentation, collaboration, observation and creative problem-solving. Attitudes: environmental responsibility, curiosity, awareness, empathy towards nature and appreciation of sustainability. Action: recycling, upcycling, environmental documentation, informed discussion, data monitoring and sustainability-oriented thinking.

EXPERIENTIAL LEARNING MATRIX

Observation—Nature Photography—Environmental awareness & observation; Communication—Presentations & Group Discussions—Expression & confidence; Critical Thinking—Environmental Debates—Reasoning & multiple

perspectives; Scientific Learning—Herbarium & AQI Indexing—Data and scientific literacy; Creativity—Best Out of Waste—Innovation & circular-economy thinking; Research—Environmental Reports—Analysis & academic writing; Global Awareness—News Collage—Media literacy & environmental awareness; Leadership—Wetlands Panel Discussion—Collaboration & student leadership.

STUDENT DEVELOPMENT OUTCOMES

Environmental Literacy; Critical Thinking; Research & Data Skills; Creativity & Innovation; Responsible Citizenship.

INSTITUTIONAL ENGAGEMENT

Student participation in the Sustainability Fair in April 2025, showcasing Best Out of Waste projects and creative approaches to resource reuse.

KEY HIGHLIGHTS AT A GLANCE

January–May 2025 five-month experiential learning cycle; all schools & branches; 8 core activities; nature + data + research; student-led learning; creativity & innovation through Best Out of Waste and Sustainability Fair participation; real-time environmental data via AQI observation and interpretation; global environmental awareness through news, policies, climate events and conservation.

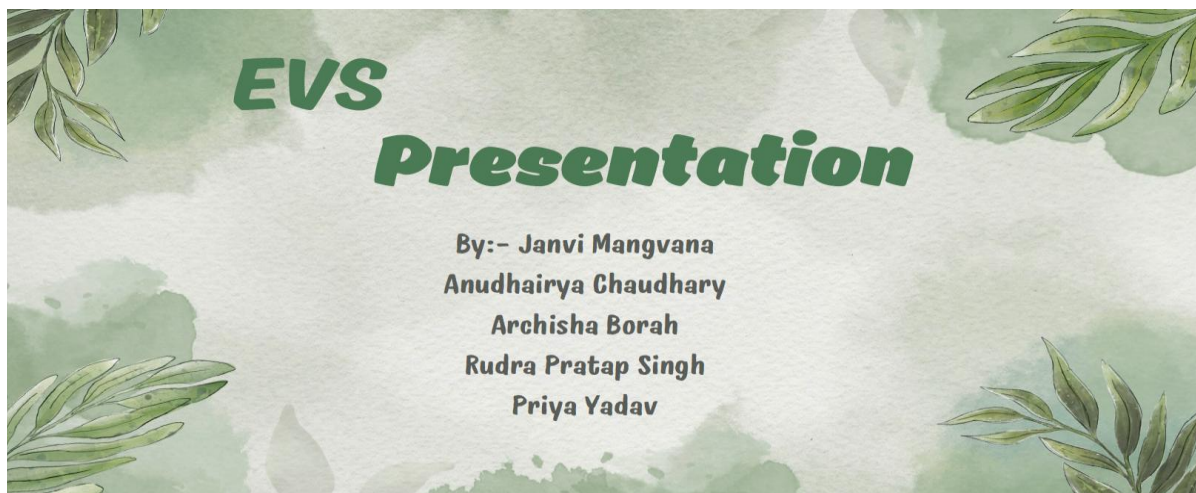
CONCLUSION

The Environmental Sustainability & Climate Change Living Lab demonstrated experiential learning through eight complementary activities spanning observation, discussion, research, data analysis, creativity and action, with Sustainability Fair participation in April 2025 strengthening classroom-to-institutional sustainability connection.

ANNEXURE: PHOTOGRAPHIC EVIDENCE

Annexure I: Nature Photography Presentation; Annexure II: Group Discussions; Annexure III: World Wetlands Day Panel Discussion; Annexure IV: Herbarium File Preparation; Annexure V: Best Out of Waste; Annexure VI: Environmental Issue Reports; Annexure VII: AQI Indexing; Annexure VIII: Environmental News Headlines; Annexure IX: Sustainability Fair Participation; Annexure X: Classroom & Student Activity Photographs.

Activity 1: Nature Photography Presentation



Impact of Plastic on Wildlife and Ecosystems



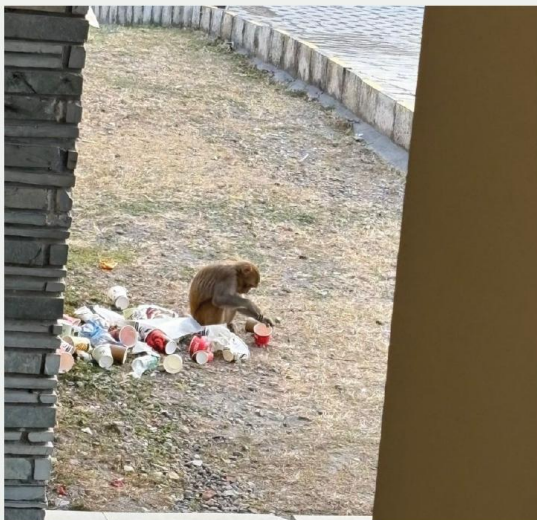
1. Litter harms animals and the environment
2. Cow risks ingesting toxins.
3. Unclean areas cause land pollution.
4. Waste disrupts soil and ecosystems.
5. Promote sustainable waste disposal.

Uncontrolled Tourism

- Overcrowding
- Environmental Degradation
- Wildlife Disturbance



Animal Harm



- Ingestion
- Entanglement
- Toxicity

Effects of Plastic on the Environment and Human Beings



- Soil Degradation
- Water Contamination
- Non-Biodegradable Nature



- Pollination
- Seed Dispersal
- Biodiversity
- Ecosystem Balance

Activity 2: Group Discussion





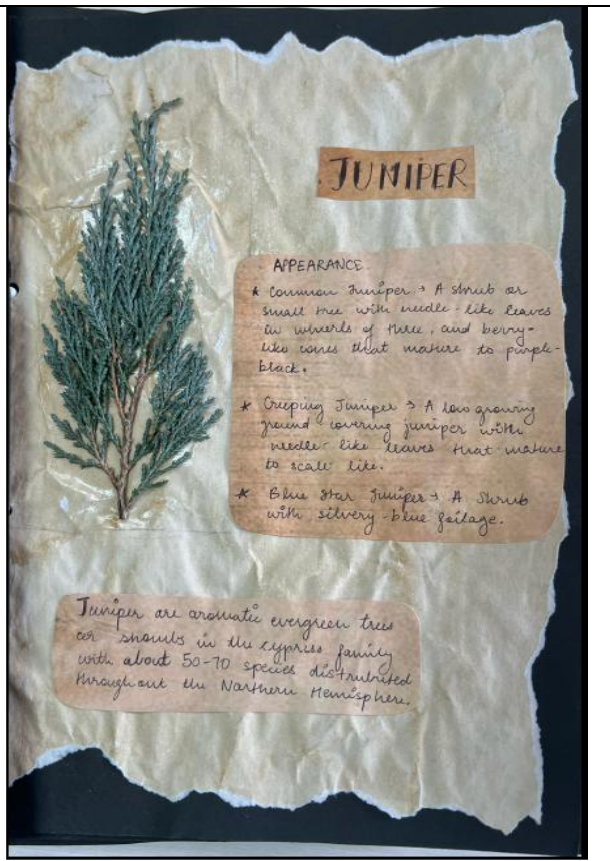


Activity 3: Panel Discussion









Oriental Thuja



The oriental Thuja, scientifically known as *Platycladus orientalis*, is a conifer native to Asia, characterized by its scale-like leaves, conical or pyramidal shape, and numerous flowering cone.

Appearance

- Grows generally mature in the fall, about 6-8 months after pollination. Foliage: The foliage consists of small, overlapping scales, creating a dense, textured appearance. The color varies from yellowish-green in youth, becoming darker green with age. Foliage may become up in winter.

Petunia



Petunia is genus of 20 species of flowering plant of South American. Petunia is famous flower due to its beautiful multi-colored trumpet-shaped flowers. It blooms in late fall, spring or autumn and its flowers are of the most commonly recognizable.

Appearance

- They come in vast spectrum of colors.
- Before solid colors, petunias can produce stripes, veining.
- They are different types of like Grandiflora, Multiflora, Petziflora wave.

Guzmania



It is tender perennial that features decumbent stems that spread along the ground. Narrow but variably-shaped, dandelion-like leaves.

Appearance

- They come in a range of colors, including bright yellow, orange, & red with some cultivars offering a variety of colors.

The plants have bluish foliage, which provides a nice contrast to the bright flowers.

- The flower close at night and may not open completely on cloudy days.

HYBRID CROTON



Appearance

Hybrid cotton plants, developed through controlled cross breeding, typically exhibit traits like uniform fiber quality, high productivity, improved resistance to pests and diseases. Hybrid cotton plants may have a shorter growing season, allowing for earlier harvest and potentially multiple crops per year.

Hybrid cotton, created by crossing two different cotton strains, offers higher productivity, wider adaptability, and better resistance to pests and diseases compared to traditional varieties.

Chrysanthemum Plant

Chrysanthemums are perennial herbaceous or slightly woody plant forming dense, rounded mounds of foliage with deeply lobed, alternate leaves and come in a wide variety of flower colour and shape including single, double & pom-pom forms.

APPEARANCE

- Chrysanthemums come in a wide range of colours, including white, yellow, orange, red, maroon, purple and pink.
- Late season bloomers, typically in fall.
- Petal organs are approx 34 nitrous.
- Have composite flower heads, which are cluster of small flowers joined together.



RUBBER PLANT

Rubber plant is a popular houseplant known for its large, glossy leathery leaves and ability to tolerate low light conditions.

It is also notable for its milky sap, or latex, which was historically used as a source of natural rubber.

APPEARANCE

- large glossy, leathery & dark green leaves
- Can be quite large, up to 12 inches long
- Broad oval, and often described as elliptic.
- Typically dark green, but can also be deep maroon.



It is commonly known as 'Jungle Guaraná' in a tropical shrub with glossy, dark green leaves and vibrant, clustered flowers in shades of red, orange, yellow and pink, blooming almost year round.

Appearance

Inhoa is a dense, multi-branched evergreen shrub typically reaching 4-6 feet in height, but can grow up to 12 feet.

It has glossy, leathery, oblong leaves that are about 4 inches long and have entire margins.

Flower colours include red, orange, yellow, pink and white.

Shami PLANT

The flowers of the shami tree are quite small and yellow or creamy-white in colour.

APPEARANCE

- The branches are often thorned along the internodes.
- It produce small, creamy-yellow flowers.
- The bark is greyish-brown & rough.
- The leaflets are dark green & have a tiny points.



Kyera



Activity 5: Best Out of Waste





Activity 6: Report on Environmental Issue

Group: 3

Topic- Case Study: Tesla's Big Battery -
A Renewable Energy Breakthrough

1. The Problem - A statewide blackout
2. The Bold Plan - Tesla's 100-day challenge
3. The fastest Energy Project Ever Built
4. How it works & why it's a game changer
5. The impact - A huge success
6. Lessons Learned and what's Next

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The Problem: A Statewide Blackout

On September 28, 2016, a severe storm hit South Australia, bringing cyclonic winds, lightning strikes, and tornadoes that caused massive destruction. The storm knocked down transmission towers, causing a cascading failure that plunged the entire state into darkness.

This statewide blackout affected over 1.7 million people, causing chaos:

- Hospitals had to rely on emergency generators
- Traffic lights stopped working, leading to road accidents
- Businessmen lost millions due to power outages
- Public transport shut down, standing thousands of commuters

This blackout lasted for hours to days in some areas, depending on how quickly power was restored. For many, the event exposed the fragility of the power grid.

The Bold Plan - Tesla's 100 Day Challenge.

In 2017, the South Australian government faced recurring power shortages and sought a solution to store excess wind energy for times of need. Tesla, under Elon Musk's leadership, proposed an ambitious solution: to build world's largest lithium-ion battery in just 100 days. Musk famously said that if Tesla couldn't complete the project within this timeframe, it would be free. This bold promise not only captured global attention but also addressed the pressing energy crisis in South Australia. The Hornsdale Power Reserve, developed in collaboration with French renewable energy company Neoen, aimed to provide a sustainable & efficient energy storage system to balance intermittent wind energy & ensure power reliability.

The Hornsdale Power Reserve, located near Jamestown, South Australia, was completed on time, marking a significant milestone in renewable energy innovation. The 100 MW / 129 MWh battery is designed to store excess wind energy produced during off-peak hours and discharge it when the grid experiences high demand or shortfalls. The project not only demonstrated Tesla's engineering prowess & commitment to renewable energy solutions but also transformed South Australia's energy landscape, helping to stabilize the grid & reduce electricity costs.

How it works and why it's a game changer

Tesla's battery technology, like the powerwall and powerpack, store electricity for later use, using lithium ion cells to store energy from renewable sources like solar panels. During the day, excess energy is captured and stored, then used when sunlight is unavailable, such as at night or during power outages.

These batteries feature an advanced Battery Management System that ensures optimal charging, discharging, and long battery life. Tesla's technology makes renewable energy more reliable by stabilizing the grid, as it stores excess power when production is high and delivers it when demand spikes or renewable sources aren't generating power.

This system enhances energy independence, allowing homes and businesses to reduce reliance on the grid and lower utility bills by supporting the use of renewable energy. Tesla's battery help reduce dependence on fossil fuels, making them a key player in the transition to a more sustainable energy future.

Tesla's scalable battery solutions make renewable energy more practical for a wide range of applications, from residential to large-scale energy storage projects.

BATCH - 18

Tesla's Big Battery - A Renewable Energy Breakthrough.

THE FASTEST ENERGY PROJECT EVER BUILT.

Most large-scale energy projects take years, but Tesla built the 150 MW Hornsdale Wind Farm, then in just 63 days, beating Musk's 100-day deadline. Installed next to Hornsdale Wind Farm, the battery stores excess wind energy and releases it instantly when needed.

Unlike traditional backup power, which can take minutes to hours to activate, Tesla's battery responds within milliseconds, preventing outages and stabilizing the grid.

Its success proved that large-scale battery storage can make renewable energy more reliable and efficient.

The Impact - A Huge Success

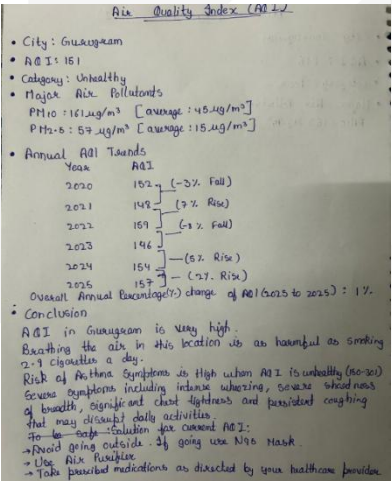
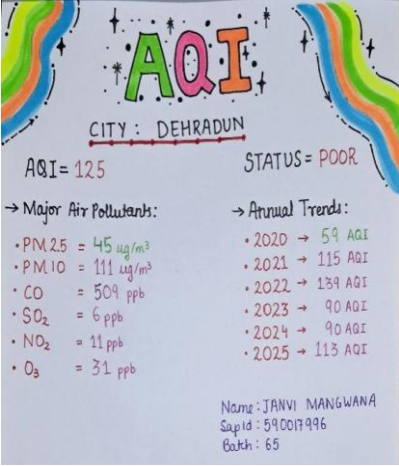
Since launching, Tesla's Big Battery has had a transformative impact on South Australia's energy landscape.

- Prevented major blackouts by responding in milliseconds, stabilizing the grid during unexpected outages.
- Saved over \$150 million in energy costs by reducing reliance on expensive fossil fuel-based power reserves.
- Reduced dependence on coal and gas, leading to lower carbon emissions and a cleaner energy mix.
- Inspired similar projects worldwide, with large-scale battery installations now being developed in the US, Europe and Asia.

Beyond financial and environmental benefits, the project demonstrated the viability of battery storage at a national scale. It provided a real-world example of how renewable energy, when paired with advanced storage solutions, can be just as reliable - if not more so - than traditional power sources.

Tesla's Big Battery not only silenced skeptics but also set a global precedent for integrating large-scale battery storage into modern energy systems.

Activity 7: AQI Indexing



Activity 8: News Headlines

AUSTRALIA

BREAKING NEWS

-April-

OUT-OF-CONTROL BUSHFIRE IN CENTRAL VICTORIA WITHIN 100M OF PRIVATE PROPERTY



Forest Fire Management Victoria fire chief Chris Hardman says fire crews have worked hard to contain the fire. What's next? Residents are advised to remain on high alert and monitor changing conditions.

NSW EPA TRACES BELUBULA RIVER PFAS CONTAMINATION TO COMPOSTING FACILITY



The NSW EPA has identified a composting facility as the most likely source for the contamination of a river in the state's Central West. PFAS levels above safe ecological guidelines were also found at a gold mine and a council-run landfill.

DISCARDED WEATHER BALLOONS FROM TASMANIA FOUND ON WARRNAMBOOL BEACH



The remnants of at least six weather balloons have washed up on south-west Victorian shores in recent months. Volunteers for a beach clean up crew have called the discarded technology state-sanctioned litter.

Palau president takes swipe at Peter Dutton over past 'sea levels' gaffe



Palau's president, Surangel Whipps Jr, has responded to an old gaffe by Peter Dutton about the Pacific's 'rising sea levels'. He urged the Coalition to back Labor's plan on a major climate change conference.

The Eco Report Of Brazil

BY GROUP-6 BATCH 65-66

Brazil Cuts Down Thousands Of Trees In Amazon Rainforest To Build Road For Climate Summit

Brazil is facing criticism for cutting down thousands of trees in the Amazon rainforest to build a road for the COP20 climate summit.



Brazil is facing accusations of hypocrisy after cutting down large sections of the Amazon rainforest to construct a road for the upcoming COP20 climate summit, according to The Telegraph. The highway, designed to accommodate tens of thousands of delegates for the UN climate conference, has raised concerns about the country's commitment to environmental protection.

Brazil asks UN to ditch proposed levy on global shipping

Brazil has asked the UN to throw out plans for a new levy on global shipping that would raise funds to fight the climate crisis, despite playing host to the next UN climate summit.



Fake documents, real deforestation drive global trade in illegal Amazon timber

"Everyone does it." That's how the representative of a sawmill described the practice of selling fake documents to illegal timber from the Brazilian Amazon as legitimate, a fraud known as timber laundering. The testimony was collected by a team from the Environmental Investigation Agency (EIA), a U.S.-based organization that fights environmental crime, during investigations into Brazil's illegal logging practices.



Brazil's Environment Minister calls for deeper Viet Nam partnership ahead of COP20

Minister of Environment and Climate Change of Brazil, Marina Silva, talks to the press about Brazil's priorities in the global fight against climate change and how partnerships with countries like Viet Nam can play a pivotal role in achieving shared environmental goals.

The life and death of a 'laundered' cow in the Amazon rainforest



Brazil is the biggest exporter of beef in the world, and more than 40% of its vast 240m-cattle herd is raised in the Amazon region. As a result, swathes of the nature-rich rainforest are being cleared and burned to create pasture.

Amazon forest felled to build road for climate summit

A new four-lane highway cutting through tens of thousands of acres of protected Amazon rainforest is being built for the COP20 climate summit in the Brazilian city of Belem. It aims to ease traffic to the city, which will host more than 50,000 people - including world leaders - at the conference in November.



Revealed: world's largest meat company may break Amazon deforestation pledges again

The world's largest meat company, JBS, looks set to break its Amazon rainforest protection promises again, according to frontline workers.

Beef production is the primary driver of deforestation, as trees are cleared to raise cattle, and scientists warn this is pushing the Amazon close to a tipping point that would accelerate its shift from a carbon sink into a carbon emitter. JBS, the Brazil-headquartered multinational that dominates the Brazilian cattle market, promised to address this with a commitment to clean up its beef supply chain in the region by the end of 2020.

Brazil is speeding-up forest fire prevention to avoid dangerous tipping points in the Amazon

Brazil is facing an alarming surge in forest fires. Last year the country registered 23,000 fires and over 20.8 million hectares of vegetation were consumed by flames - an area the size of Italy. This represented a 70% increase in area burned compared to 2019. The Amazon confirmed to be the worst, accounting for 56% of the total burned area. The threat of more fires during the 2020 fire season prompted the Brazilian government to declare a nationwide environmental emergency. Early this year, the Supreme Court ordered the federal government and all Amazon and Pantanal states to draw-up emergency fire management plans.



Spending more to trigger savings may not be wise

It's special: Katie Ledesky qualifies for fourth Games



'Bridgerton' actor gives insight into character

DOUBLE THE PUZZLES, DOUBLE THE FUN IN LIFE

'Stealth' tax takes bite of Social Security benefits

Jackson shows new vulnerability in 'Invasion'



Black voters are drifting from Biden

But these voters aren't going toward Trump



Massive heat wave coming for USA

It's what officials have been dreading, but preparing for

How long will US, ally aid endure?

Support likely tied to new offensive to root out Russia

Federal trial set to begin Aug. 14

Though room will try to slow trial pace, expect ups

Climate change brings blight to our beaches

EARTH ON THE EDGE

1.5 BILLION HECTARES OF LAND DEGRADED GLOBALLY

SEA EROSION

CHANGE IN LAND COVER, A RISING CONCERN

GLOBAL PLASTICS TREATY

People, planet held hostage by private profits

Here are a few photos from the classes and the activities are given below:



Class of Chemical Engineering and Petroleum Engineering



Best out of waste from the batch 35 and 36



Aashna Suman with the best out of waste using paper from batches 35 and 36.



Participated in the Sustainability Fair in April 2025.



Participation in the Sustainability Fair with their project to best out of waste from batch 29-30.



Herbarium preparation from the class to understand the plants and their details, and the library.