# GREEN CAMPUSES AS LIVING CLASSROOMS: INNOVATIVE BIODIVERSITY EDUCATION PRACTICES AT GURUDAS COLLEGE, KOLKATA -54, INDIA

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## Abstract

Experiential learning has emerged as a transformative pedagogical approach in higher education, particularly in disciplines such as Botany where field observation and interaction with living specimens are indispensable. Gurudas College, Kolkata, offers a unique opportunity for biodiversity-based experiential learning within its green campus, which houses diverse habitats including a medicinal plant garden, a mango orchard functioning as a field gene bank, an ornamental gardenand large avenue trees. The National Service Scheme (NSS) and Vasudha, the Nature Club of Gurudas College, play a significant role in spreading environmental awareness, organizing educational activities, and observing important environmental days, thereby reinforcing experiential learning and fostering community engagement. This paper highlights how such campus-based experiential learning fosters environmental awareness, botanical curiosityand a sense of ecological stewardship among undergraduate students.

**Keywords:**
Experiential learning, biodiversity, eco-pedagogy, green campus, Gurudas College, Kolkata, invasive species, medicinal garden, mango gene bank, NSS, Vasudha

## 1. Introduction

The study of Botany thrives on direct engagement with nature. Traditional classroom teaching, while essential, often limits students' exposure to the complexity of living systems. Experiential learning bridges this gap by transforming learners from passive recipients into active participants in scientific exploration [1]. Green campuses in urban environments act as vital ecological laboratories, enabling students to observe, record, and analyze biodiversity in real time [2,3].Gurudas College, Kolkata, exemplifies this model through its rich green infrastructure and diverse plant assemblages that serve as

dynamic educational resources [4].The National Service Scheme (NSS) and Vasudha, the Nature Club, supplement academic learning by organizing workshops, tree plantation drives, awareness campaigns, and observance of important environmental days such as World Environment Day and Van Mahotsav, linking campus-based biodiversity studies with wider societal impact. The role of the NSS and Vasudha strengthens student engagement and community awareness, ensuring that learning extends beyond the campus to broader environmental stewardship [5].Through structured biodiversity explorations, students engage directly with plant identification, taxonomy, ecology, and conservation concepts, thereby linking theoretical knowledge to real-world ecosystems.

## 2. Biodiversity Resources of Gurudas College, Kolkata -54.

The Gurudas College campus is a microcosm of urban biodiversity, containing multiple green zones that support experiential learning across seasons [6].The campus landscape, dissected by two major public roads, still maintains ecological continuity through its vegetation cover. The Golden Jubilee Campus contains an open field that exhibits seasonal ecological transformations viz. from barren terrain in winter to dense weed and shrub growth during the monsoon, providing real-time examples of plant succession and invasive species dynamics. Additionally, potted collections of rare plants and fruit trees serve as living teaching materials where students can learn cutting, grafting, and propagation techniques.

### 2.1 Medicinal Garden

A well-maintained medicinal garden forms a living repository of ethnobotanical knowledge [7].Students identify and document species with traditional therapeutic uses, learning to correlate morphological traits with pharmacological potential. This space supports activities such as herbarium preparation, plant taxonomy, and discussions on traditional medicine and conservation.

### 2.2 Mango Field Gene Bank

The college's mango field serves as a gene bank conserving several traditional varieties of *Mangifera indica* L. from Malda and Murshidabad districts of West Bengal [8, 9].This *ex situ*conservation site allows students to study morphological variation, phenology, and genetic diversity among cultivars. It also provides scope for hands-on training in vegetative propagation and orchard management, linking botany to applied agricultural biodiversity [10].


Fig. 1. Mango Field Gene Bank of Gurudas College.

### 2.3 Ornamental Garden and Seasonal Variation

The ornamental garden, vibrant with seasonal flowers, offers students opportunities to observe floral morphology, pollination ecology, and landscape aesthetics. Students track flowering seasons, compare ornamental and wild types, and appreciate the role of horticulture in maintaining biodiversity in urban spaces.

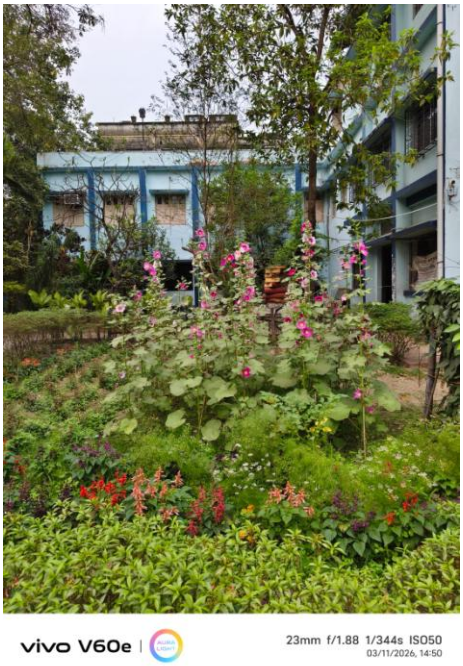


Fig. 2. Ornamental garden of Gurudas College.

### 2.4 Avenue Trees and Campus Ecology

Despite being dissected by two major public roads, the main campus of Gurudas College remains shaded by large avenue trees that contribute to microclimatic regulation and carbon sequestration. These trees provide natural habitats for birds, insects, and epiphytes, allowing students to study plant-animal interactions and urban ecology.

**2.5 Golden Jubilee Campus and Seasonal Dynamics**

The Golden Jubilee Campus includes an open field that dramatically changes across seasons, dry and barren in winter but lush with weeds and shrubs during the monsoon. The area becomes a field laboratory for understanding invasive species colonization, ecological succession, and adaptation to seasonal rainfall. Students identify common monsoon weeds and assess their ecological impact, thus learning to analyze dynamic plant communities. Quadrat study is undertaken every year in this campus.

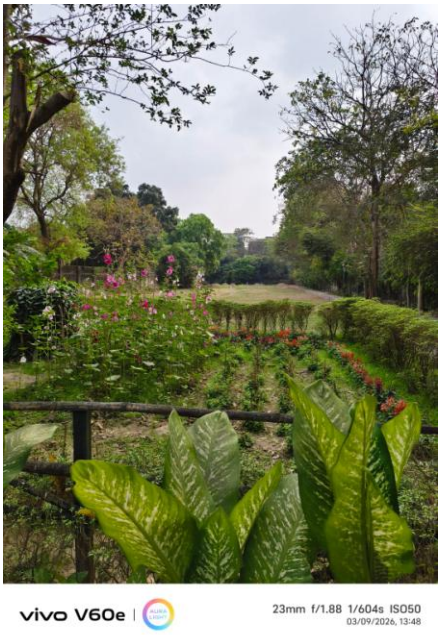


Fig. 3. Golden Jubilee campus in March, 2026.

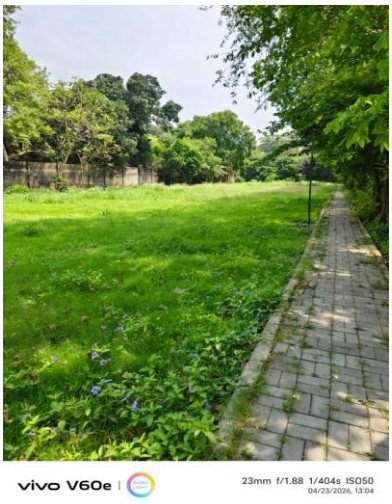


Fig. 4. Changes in the vegetation cover of the Golden Jubilee campus, April, 2026.

Fig. 5. Quadrat Study in the Golden Jubilee campus.

**2.6 Potted Plant Collections and Propagation Training**

Rare and delicate species are maintained in pots across the Botany Department premises. These plants serve as living specimens for propagation studies. Faculty members demonstrate cutting, layeringand grafting techniques using these potted collections, bridging theoretical instruction with practical horticultural skills.


Fig. 6a. Potted plants in Gurudas College campus.


Fig. 6b. Potted plants in Gurudas College campus.

**2.7 Fruit Trees and Ecosystem Services**

Fruit-bearing trees scattered across the campus enhance aesthetic and nutritional value while supporting biodiversity through their role in food webs. Observing pollinators, fruit developmentand seed dispersal mechanisms deepens students' ecological understanding.

**3. Experiential Learning as a Pedagogical Approach**

Experiential learning transforms the college landscape into an open classroom where learning occurs through observation, experimentation, and reflection. Activities such as biodiversity mapping, seasonal plant surveys, and ecological documentation cultivate curiosity and scientific temperament. Students learn to maintain field notebooks, develop photographic records, and prepare herbarium specimens under faculty guidance. This active engagement with flora enhances comprehension of taxonomy, physiologyand ecology while fostering environmental sensitivity and critical thinking. Collaborative projects, such as documenting invasive species or studying the phenology of medicinal plants, also develop teamwork and research skills. The NSS and Vasudha further enrich this approach by engaging students in hands-on environmental activities and community outreach programs.

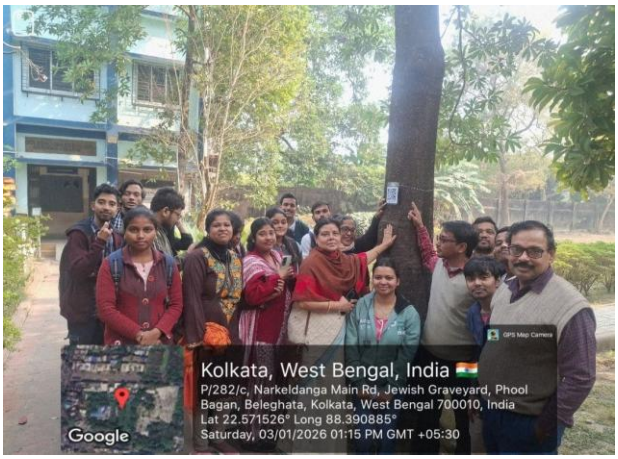


Fig. 7. Campus diversity study in Gurudas College campus.


Fig 8. Avenue tree diversity study from the Terrace of Gurudas College.

**4. Integrating Eco-Pedagogy and Sustainability**

Green campuses like Gurudas College play a vital role in fostering sustainability values among students. By linking classroom concepts to real ecological observations, experiential learning promotes conservation-oriented thinking. Understanding biodiversity within their immediate environment helps students appreciate the importance of green spaces in mitigating urban pollution, supporting pollinators, and preserving native flora.

The college's commitment to maintaining its medicinal garden, mango gene bankand open green zones also aligns with the principles of the United Nations Sustainable Development Goals (SDGs 4 and 15) on quality education and life on land [11, 12].The NSS and Vasudha supplement these efforts by conducting environmental awareness

programs, plantation drives, and educational events on key environmental days, reinforcing the ethical and practical dimensions of sustainability education.

## 5. Conclusion

The Gurudas College campus demonstrates how biodiversity-rich educational environments can transform botanical education through experiential learning. Its diverse plant habitats, from medicinal and ornamental gardens to open monsoon fieldsprovide living laboratories that bridge theory and practice. Engaging students directly with nature nurtures ecological awareness, scientific inquiry, and respect for biodiversity, embodying the essence of eco-pedagogy in higher education.

## Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this work.

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