# A Report on
# Environmental Audit of
# Gauhati University Campus

## IQAC, Gauhati University
## 2017

# Prologue

This report is a preliminary rapid assessment on the status of environment and various practices followed in the Gauhati University Campus so as to minimize the impact on the environment. Available information on various environmental parameters, except the biodiversity aspects, are inadequate to prepare a comprehensive report. As such the data produced and comments thereon are only indicative and may need further validation. In spite of the inherent limitations, however, this compilation provide an insight of the status of the environment in the campus and the practices that point more towards what need to be done further for a better and sustainable campus environment.

**Contributions from the following are acknowledged while preparing this report:**

- Biodiversity (report and photographs) — Prof. Prasanta K. Saikia, and Dr. Malabika K. Saikia, Department of Zoology, GU
- Fish diversity and Wetland water quality: — Prof. Dandadhar Sarma, Department of Zoology, GU
- Photographs of Odonates in GU campus — Dipti Thakuria, Research Scholar, Dept. of Zoology, GU
- Air and noise data: — Prof. H. P. Sarma (Hon'ble Rector) and Prof. S. Kalita, Dept. of Environmental Science, GU
- Physical infrastructure and landuse: — Sri Sanjib Barua, Supdt. Engineer, GU
- Landuse analysis: — Parag Phukon, Department of Geological Sciences, GU
- Campus photographs — Dr. Pranjit Hazarika, Department of Geological Sciences, GU
- Information on mode of transport — Dr. Uday K. Khanikar, Jt. Registrar, GU
- Water quality parameters (drinking water) — Greentech Environmental Engineer & Consultants, Guwahati
- Plot of noise and air quality data; analysis of IMD gridded data for rainfall, temperature : — Sri P. P. Gogoi, (Dept. of Earth and atmospheric Science, IIT-Bhubaneswar) and Parag Phukon, Department of Geolgocial Sciences, GU
- Overall report compilation — Parag Phukon, Department of Geological Sciences, GU

## Introduction

Gauhati University is located at the southern bank of the Brahmaputra and towards the northern edge of the Shillong plateau. The main campus spread over an area of ~508.8acre (1539 bigha, as per land record) between Jalukbari traffic point in the east and Satmile point towards west (Figure 1). A small satellite area of about 1acre (3bigha) is available just across the Jalukbari traffic junction towards east and another small setup is developed in the main city centre at Ambari area. The main campus is characterised by low lying residual hills towards south and a number of wetlands towards north with intervening high grounds thus making it a picturesque landscape suitable for a wide spectrum of terrestrial and aquatic flora and fauna. The university has 45 PG Departments, 4 UG departments and 5 centre of studies with 114 PG courses and 15 distance mode courses. It has a high footfall with nearly 4000 PG enrollment (2017) and as much as 2,79,085 (2016-2017) enrollment in the 325 affiliated colleges offering 65 UG courses .

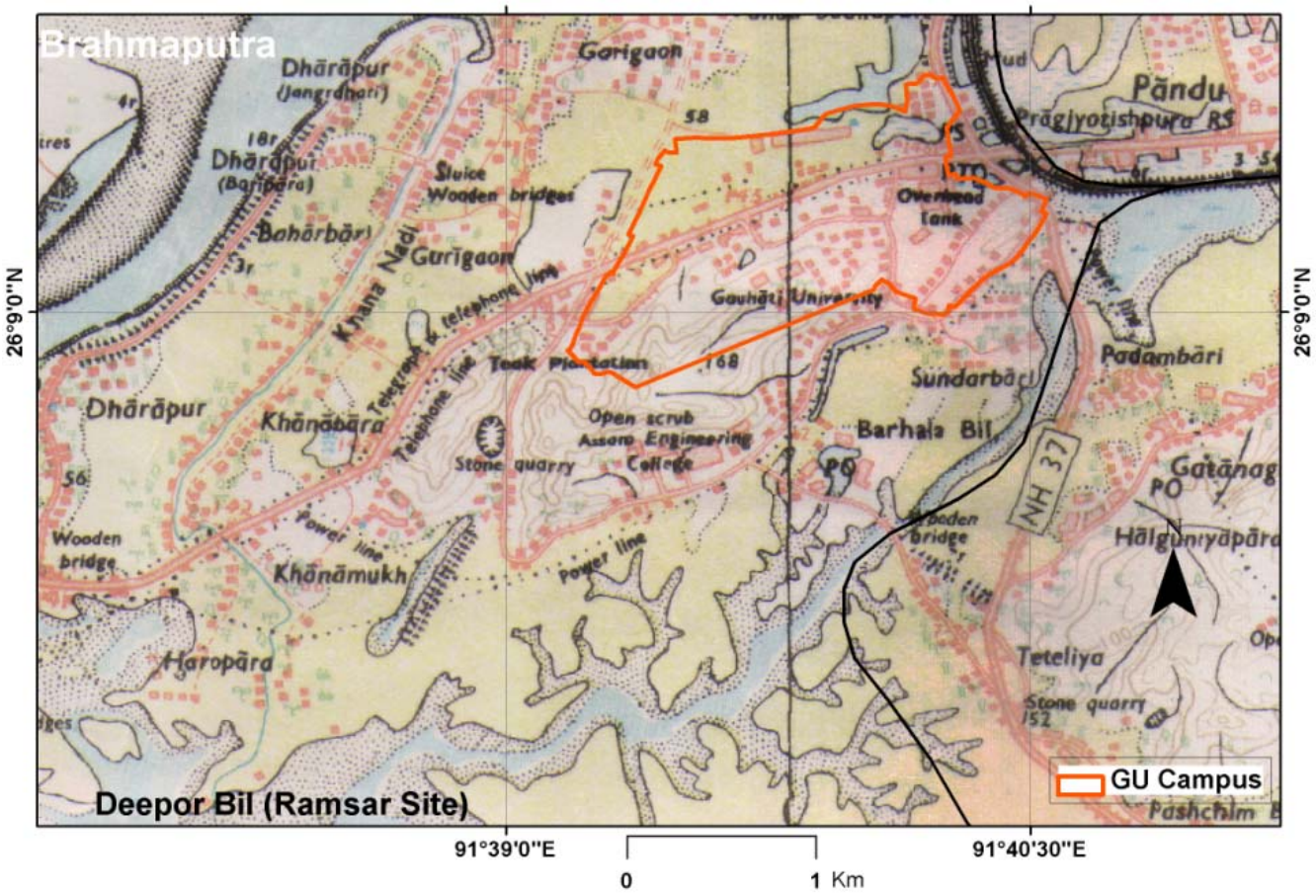



**Figure 1:** Survey of India topographic map showing the Gauhati University campus. The Brahmaputra can be seen towards North West and the Deepor Beel, a Ramsar site, towards south

## Landuse landcover

A survey conducted by Gauhati University in 2015 shows a total of 484 acres of land in the main campus of which ~75 acres are under wetlands, 91 acres under natural forests and ~2acres under the botanical garden that together constitutes 168 acres (~34.7%; Figure 2). Four segments of the natural forests are found in the southern hills (Figure 3A, B). Organised plantations in the campus is mainly along the internal roads (Figure 3C ) and together with the homestead plantations around residential units they add to the overall green cover. Thus the green cover including natural forests, botanical garden (Figure 3D ) and plantations forms ~20% of total area. However, many of the wetlands have been silted up and presently under thick cover of grass and aquatic plants which also contribute towards the overall green landscape (Figure 3D ). As per the aforesaid survey of Gauhati University there are a total of twenty wetlands of various sizes that are home to a wide diversity of aquatic flora and fauna. Efforts have been made in conserving these wetlands and towards these some of the wetlands have been desilted and cleared of the top biomass cover (Figure 3E).

## Builtup environment

Table 1 shows different types of builtup and their area coverage. Since there has been some additional builtup post 2015 survey, the actual figure under the total builtup will be little more than shown here. It is found that a total of about 78.4 acres (~16.2% of total) are under the builtup category, of which Assam type residential units, hostels and administrative units form a significant part. In absence of available high ground for further new constructions, many of the wetlands are being filled up thus shrinking the natural wetland cover in recent times. Since the wetlands are vital component of the campus landscape and biodiversity, it is of paramount importance to preserve them. This can be achieved through optimal utilization of the builtup areas under Assam type houses making way for more vertical expansion. It is important to note that in the face of filled wetlands, the campus will face a waterlog environment which will create problem for the existing structures at a lower ground.

Another important feature of the campus is the Aquaculture and Biodiversity Centre (Figure 4) under supervision of the Department of Zoology with continued research, both in-house and through external collaboration. Facilities in this centre has been developed through partial filling of one of the largest wetlands which has however, increased the waterlogging condition in the surrounding areas.

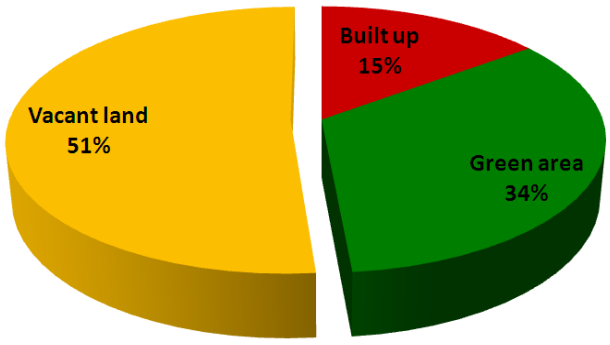



**Figure2** Distribution of landuse landcover in Gauhati University campus. The green cover shown includes the botanical garden and the wetlands while the builtup area excludes playgrounds

Considering the present landuse and landcover about 50-51% of land should be available for future expansion excluding the green cover and built up (Figure 2) . However, this is an overestimation because of the fact that these are mostly spread around the builtup areas, a significant part of which are around the Assam type residential units.

**Table 1:** Built up categories in Gauhati University Campus
(Based on GU survey 2015)

| Category | Type of built up | Number | Area (sq.m.) | Area (acre) | % of total |
|---|---|---|---|---|---|
| **A** | Teacher's quarter-AT and RCC | | 31088.27 | | |
| | Assam type house | 384 | 63437 | | |
| | Hut | 229 | 5420 | | |
| | Hut area | 3 | 2511 | | |
| | Building | 130 | 62500 | | |
| | Building under construction | 25 | 2601 | | |
| | School | | 3286 | | |
| | Security house | | 104 | | |
| | Namghar | 2 | 495 | | |
| | Stadium pavilion | | 566 | | |
| | Road metalled | | 14682 | | |
| | Road unmetalled | | 755 | | |
| | Brick road | | 53 | | |
| | Water tank | | 1100 | | |
| | Sub total | | 188598.27 | 46.6 | |
| | New by pass (NH37) | | | 27.4 | |
| | Total built up (A) | | | 74.0 | 15.3 |
| **B** | Botanical garden | 1 | 8284 | | |
| | Playground | | 7263 | | |
| | Garden | 11 | 2183 | | |
| | Total under recreational and other use (B) | | 17730 | 4.4 | 0.9 |
| | | | **Grand total A+B** | **78.4** | **16.2** |


**Figure 3:** The forest and wetlands
**A** Thick forest in the background and a grass covered and silted up wetland in the foreground towards south western part of the campus, **B.** Type of forests and canopy cover, **C.** The botanical garden behind Department of Chemistry, maintained by the Department of Botany, **D.**Plantation along the roads, **E.** Wetland with removed biomass, **F.** Ponds preserved out of the wetland in front of the New Academic building and GUIST *(Photographs: Pranjit Hazarika)*


**Figure 4:** Aquaculture and Biodiversity Centre, GU*(Photograph: Pranjit Hazarika)*

## Biodiversity

The natural landscape in GU campus including primary forests, hilly terrain, household gardens, Botanical Garden, Biodiversity Parks, vegetated and open water wetlands and marshy lands etc. have provided a unique setting conducive for a wide flora and and faunal diversity including endangered species of mammals, birds, herpetofauna and Arthopods etc.. The vegetation in general can be classified as bamboo forest, woodland forest, hilly forest, marshy lands, cultivated forest and open water space etc. The area supports varieties of migratory and residential water birds and IUCN threatened species of mammals and birds like Greater Adjutant Storks, Lesser adjutant storks, Bengal Slow Loris, Common Leopards, Turtle and Tortoises, Burmese Python etc. The area also supports breeding population of Indian Wildlife Protection (Act) 1972 endangered species like Large Whistling Teals etc.

Based on long term study of the faunal diversity through direct observation and indirect evidences like Camera Trappings, animal rescue operation of the faunal species encountered within the Gauhati University campus a comprehensive lists of mammals, birds, Amphibian fauna, Reptilian fauna, Butterfly fauna, other insect and Arthopodan fauna etc. has been prepared by the Department of Zoology Gauhati University to highlight the importance of the area for the biodiversity point of View. Summary of the compilation on faunal diversity is given in Table 2 (also see Annex I). Representative photographs of various groups are shown in Figure 5.

Present conservation efforts for biodiversity include setting up of artificial bird nests and Bat house to and generation of reliable database on animal species covering all groups.

**Table 2:** Summary of faunal diversity in Gauhati University campus

| Sl. No. | Type of fauna | | Number of species | Remark |
|---|---|---|---|---|
| 1 | Mammal | | 22 | Compilation by Prof. P. K. Saikia and Dr. Malabika Kakati Saikia,Department of Zoology, GU |
| 2 | Bird | | 149 | |
| 3 | Amphibian | | 05 | |
| 4 | Snake 11 | | | |
| 5 | Lizard | | 12 | |
| 6 | Turtle | | 05 | |
| 7 | Butterfly | | 147 | |
| 8 | Odonate | Anisoptera (Dragonfly):28 | 48 | |
| 9 | | Zygoptera (Damselfly): 20 | | |
| 10 | Spider | | 40 | |
| 11 | Coleoptera | | 21 | |
| 12 | Fish | | 15 | Compilation by Prof. Dandadhar Sarma, Department of Zoology, GU |

**Figure 5A:** Faunal diversity in GU campus. Representative species of snakes, amphibians, butterfly, migratory bird and the endangered Greater Adjutant Stork *(Photograph: P K Saikia)*

**Figure5B:** Odonates in GU campus *(Photographs courtesy: Dipti Thakuria)*

## Temperature and Rainfall

Gauhati University campus is characterised by humid tropical climate with predominant influence of south west monsoon that brings in an average annual rainfall of more than 1200mm. (Figure 6) during June-Sept. Thunderstorms are common during both pre monsoon and monsoon months.

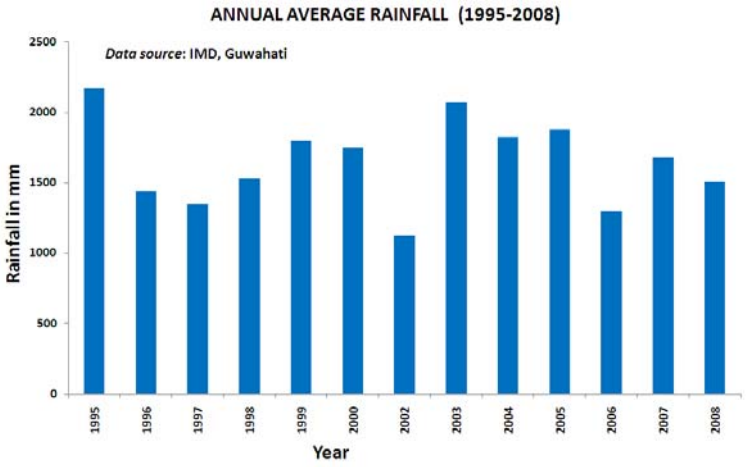



**Figure 6:** Thirteen year (1995-2008) annual rainfall record at Borjhar, Guwahati, ~10km west of the Gauhati University campus

Variation of temperature over Gauhati University (GU) based on representative IMD gridded dataset (spatial resolution of $1^{o}$x$1^{o}$) nearest to Gauhati University shows a rise of mean temperature since 1986 both annually and seasonally. Inter-annual variability has also been observed during the period (Figure 7)**.** Similarly $0.25^{o}$ x $0.25^{o}$ IMD gridded data for rainfall shows a declining trend over the years both annually and seasonally. The total annual decrease in rainfall over Gauhati University in the past 30 years is ~ 42 mm. However, the decrease in the JJA season is even higher which is ~90 mm (Figure 8). However, these data and trend are only indicative and need to be corroborated with actual measurements within the campus.

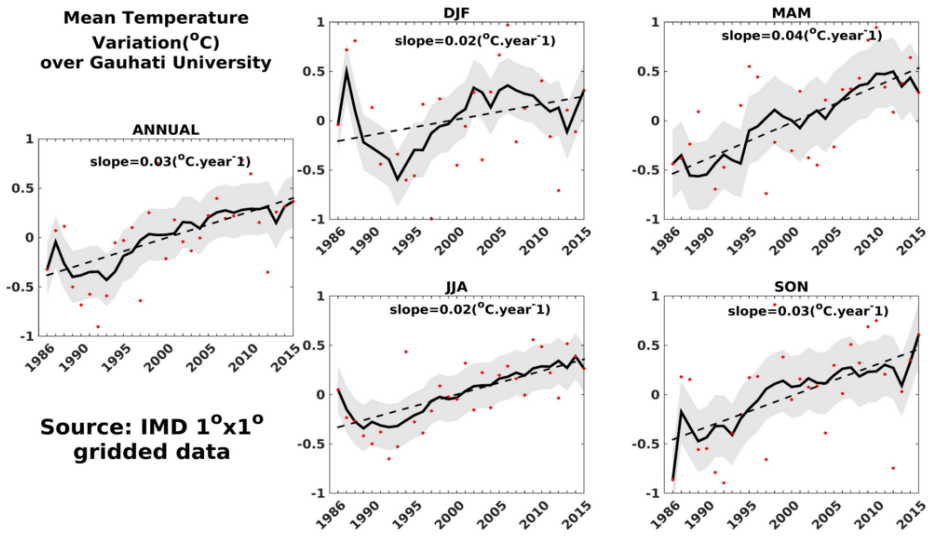



**Figure 7.** Mean Temperature Anomaly trend during the past 30 years (1986-2015) over Gauhati University. Shaded grey region indicates the standard deviation of the 10-point running mean (black solid line) of the dataset (red dots). m denotes the slope. The figure is generated using MATLAB 2015b, www.mathworks.com.

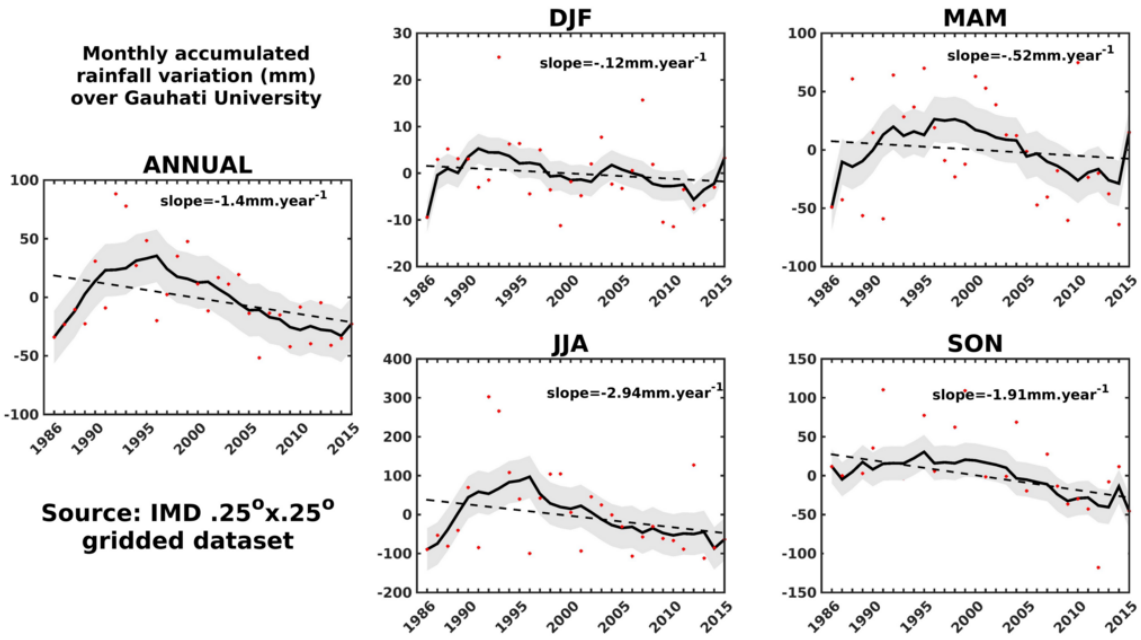



**Figure 8.** Monthly Accumulated Rainfall Anomaly trend during the past 30 years (1986-2015) over Gauhati University. Shaded grey region indicates the standard deviation of the 10-point running mean (black solid line) of the dataset (red dots). m denotes the slope.The figure is generated using MATLAB 2015b, www.mathworks.com.

## Energy requirement and management

Gauhati University receives its power supply through the dedicated lines of Assa Power Distribution Company Ltd., Govt of Assam apart from its own generation from solar installations. Presently the connected load is about 1552 KW, of which ~80% is being utilized i.e., ~1240KW. Considering its future growth prospects, a prognosticated requirement is about 2500KW in next five years. This will entail a significant increase in power bill over the present outgo of ~26-27Lakhs annually.

**Gauhati University has a two pronged strategy in this scenario:**

1. Efficient power management and
2. Increase in green energy- solar installations

Efforts are already taken for power efficient installations including

- change over to LED lighting,
- underground cable laying for the entire campus by 2020. This is necessitated because every year a major recurring expenditure involves repairing and replacing the overhead transmission lines particularly due to storms in pre monsoon and monsoon season
- installation of a 33KV substation in near future
- Recalculation of load and installation of equipment/facility against approved load
- installation of meters for different academic blocks and hostels for monitoring and rationalisation

Over the years there has been continued efforts in better power management as can be seen from gradual reduction of incandescent lights changed over to fluorescent lights and then to LED in recent times (Table 3, Annex. II). The following table shows the present lighting scenario:

**Table 3:** Different types of lighting arrangements in various establishments in G.U.

| Type of bulb/tube | Total wattage | % of toal |
|---|---|---|
| Incandescent | 19380 | 6.981846479 |
| LED | 29487 | 10.6229983 |
| CFL | 228710 | 82.39515522 |
| Total | 277577 | |

- Out of total 16053 light points in the campus, only 323 points are now having incandescent lights of 60W which is just 2% of the total (~19.4KW).
- Considering that each of the 60watt (800lumens) lights can be replaced by 8-12W LED, a further power saving of 15.5KW can be achieved. Similarly replacing existing CFL bulbs/tubes by LED can reduce the power requirement by nearly 50% in the lighting.

## Harnessing green energy: Solar power installations

Presently Gauhati university produces 100KW of solar power from two installations (Figure 9), one at the GUIST campus (40KW) and the other at the IDOL (60KW). Another installation with 25KW capacity is to be commissioned shortly at the rooftop of the Library building. Further arrangements have been made with Solar Energy Corporation of India (SECI) for installation of one Grid Interactive Roof top Solar plant of a total capacity of 1000KW within next few months which will constitute nearly 50% of power requirement in the campus. This additional capacity together with increasing efficiency in transmission and use of LED lights, Gauhati Unviersity is expected to achieve a comfortable position in terms of power management. However, a detail energy audit for individual administrative units, academic departments and hostels need to be carried out for better energy management.

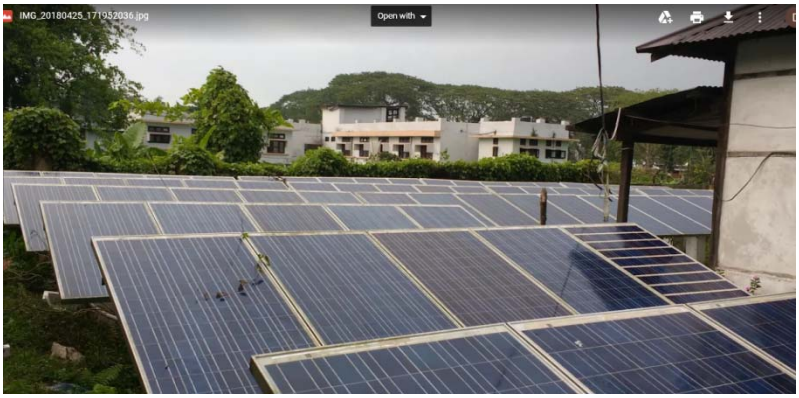



**Figure 9:** Solar panels installed at the GUIST campus that generate ~40KW of power

## Waste disposal/landfills

At present there is no developed landfill site inside the campus. Domestic wastes are disposed through an arrangement with the municipal waste disposal system with alternate day on-site collection. There is however, no system for segregation for biodegradable and non degradable waste at the source points. Academic departments and administrative units also donot have an efficient waste disposal mechanism in place. Non segregated wastes are simply thrown except at few points where garbage beans and pits are available.

The university now has taken a proactive initiative for proper waste disposal and as per the plan an incinerator is already installed (Figure 10) for non biodegradable waste management. A site towards the south west corner is under development for in-campus garbage disposal at an isolated place and is expected to be functional soon. There is also proposal for construction of pits near the hostels for biodegradable wastes.

A point of concern is disposal of hazardous wastes arising out of the labs of academic departments and the increasing piles of e-waste. No policy or mechanism is in place at present to deal with these wastes. However, efforts are underway to develop an arrangement for hiring professional services for handling such wastes in near future.

**Figure 10:** Incinerator installed in front of the GU Hospital

## Landscaping, plantation and cleanliness

A committee has been constituted to oversee the landscaping and plantation in the campus. Various measures undertaken are at different levels of implementation. Occasionally however, plantation programmes and cleanliness drives are taken up through student and teacher participations (Figure 11 ). It is a common practice for most of the students of Gauhati University to get involved in massive cleanliness programmes organised on the occasion of Varsity Week. This participatory programme is a much lauded one and may be encouraged to be taken up more frequently instead of confining to a one day programme in a year.

Many of the academic departments and administrative buildings have designated garden areas which are not being maintained and need immediate attention. Except a very few, most of them remains unattended. Their upkeep may be part of the overall green initiative through participation of all sections of the university community. Following new construction/renovation of buildings huge concrete wastes are generated and often seen piled up at the building backyard. Lack of facelift of many of the building backyards give a shabby look to the structures. Herds of cows often create problems inside the campus which need to be controlled. Occasional use of open spaces for organizing functions leave behind plastic and other garbage that contribute towards inclean environment. There need to be a policy on placing the onus of garbage clearance post event on the organizers and this should be strictly enforced.

**Figure 11:** Plantation and cleanliness programme at an academic department.Hon'ble Vice Chancellor, and the Rector, GU(top left and right respectively) and students (bottom left) are seen with their planted saplings. A cleaning programme by the students is underway (Bottom right)

## Status of water quality

Supply of water in the campus is met through an arrangement with the Public Health Engineering Department (PHED) of Govt. of Assam. A total of about 2800cubic m of water is supplied daily from the hilltop PHED reservoir. However, individual water requirement could not be ascertained because the same plant also supply water to the neighbouring Assam Engineering College, Govt. Ayurvedic College and some other settlements.

Water is drawn from the Brahmaputra river near Pandu and lifted to the hilltop treatment plant towards southern side of the campus. Groundwater is found at shallow depth and surface water is abundant from a number of ponds and wetlands within the campus. However, pipe water supply from the treatment plant is the principal source for most of the uses in GU campus. Quality testing for its basic parameters excluding the bacteriological test, for two sources of tape water shows that all the parameters are well within the prescribed limit for drinking water (Table 4A).

Although wetlands and ponds are not used as source of drinking water its quality is important for aquatic ecosystem. Random testing for basic water quality in these surface sources are carried out. Representative data available from the Department of Zoology, GU are shown in the Table 4B.

At present rainwater harvesting is entirely absent in the campus primarily because of easy availability of surface and ground water. However, one rain water harvesting proposal has been approved for the Adminsitrative block where the Office of the Vice Chancellor is located and is expected to be functional from the coming monsoon season.

**Table 4A:** Basic water quality parameters (from two drinking water sources)

| Sl. No. | PARAMETERS | UNIT | METHODS | RESULTS | | IS-10500:2012 | |
|---|---|---|---|---|---|---|---|
| | | | | Drinking water soruce at Hostel | Tape water at Quarter | Requirement (Desirable Limit) | Permissible Limit in the absence of alternate source |
| 1# | Alkalinity as $CaCO_3$ | mg/l | APHA 22ND EDITION, 2012 | 25 | 20 | 200 | 600 |
| 2 | Chloride | mg/l | | 10.9 | 11.8 | 250 | 1000 |
| 3 | Colour | Hazen | | 3 | 2 | 5 | 15 |
| 4 | Conductivity | µs/cm | | 0.119 | 0.123 | _ | _ |
| 5 | Iron | mg/l | | 0.14 | 0.11 | 0.3 | No relaxation |
| 6 | pH | _ | | 6.72 | 6.68 | 6.5 - 8.5 | No relaxation |
| 7 | Sulphate | mg/l | | 74.5 | 89.9 | 200 | 400 |
| 8 | Total Dissolved Solids | mg/l | IS:3025 (Part16) | 145 | 250 | 500 | 2000 |
| 9 | Turbidity | NTU | APHA 22ND EDITION, 2012 | 2 | 1 | 1 | 5 |

**Table 4B:** Water quality of the natural wetlands and ponds
Location: GU Biodiversity centre
(*source*: Prof. D. Sarma, Dept. of Zoology, GU)

| Wetland 1 | Wetland 2 | Wetland 3 |
|---|---|---|
| pH - 5.2 | pH – 5.8 | pH – 5.6 |
| DO - 4.2 mg/l | DO – 4.6 mg/l | DO – 5.9 mg/l |
| $NH_4^+$ - 1.84 mg/l | $NH_4^+$ - 2.1 mg/l | $NH_4^+$ - 1.36 mg/l |
| $NO_3^-$ - 5.6 mg/l | $NO_3^-$ - 6.3 mg/l | $NO_3^-$ - 7.45 mg/l |
| ORP - 289 mv | ORP - 263 mv | ORP – 253 mv |
| Cond – 193.2 µs/cm | Cond – 236.6 µs/cm | Cond – 289.0 µs/cm |
| $Cl^-$ - 146.2 mg/l | $Cl^-$ - 129.7 mg/l | $Cl^-$ - 186.5 mg/l |
| Temp – 21.2°c | Temp – 21.2°c | Temp – 21.4°c |

Table 4B contd.

| Pond 1 | Pond 2 | Pond 3 |
|---|---|---|
| pH - 7.4 | pH – 6.9 | pH - 7.7 |
| DO - 7.3 mg/l | DO – 6.6 mg/l | DO – 6.1 mg/l |
| $NH_4^+$ - 0.87 mg/l | $NH_4^+$ - 1.34 mg/l | $NH_4^+$ - 0.57 mg/l |
| $NO_3^-$ - 3.4 mg/l | $NO_3^-$ - 3.9 mg/l | $NO_3^-$ - 5.31mg/l |
| ORP - 176.4 mv | ORP - 234 mv | ORP – 327.3 mv |
| Cond - 274µs/cm | Cond - 253µs/cm | Cond – 269 µs/cm |
| $Cl^-$ - 214 mg/l | $Cl^-$ - 196.2 mg/l | $Cl^-$ - 234 mg/l |
| Temp – 21.1°c | Temp – 21.3°c | Temp – 21.1°c |

## Status of air quality

Continuous air quality monitoring is underway at the Department of Environmental Science, G U and data are available under the MAPAN programme and pollution Control Board, Govt. of Assam. A representative dataset is presented in Table 5,6,7 (also see Figure 12). The monthly average airquality data for the year 2016 available at the Department of Environmental Sciences, GU under MAPAN programme is hown in Table 5. shows that two parameters viz., CO2 and CH4 are much higher. The CH4 component is particularly high which need to be further verified. Higher values in the annual average for both these parameters are also higher than the CPCB permissible limits (Table 7). These data need to be urgently validated using certified and calibrated instruments.

High density of vehicles in the campus particularly during the peak working hours besides movement of commercial vehicles through the main university road, use of DG sets in some establishments (e.g., central DG sets in front of the Dept. of Physics, GUIST, IDOL, BKB Auditorium, PD Hall, Dept. of Chemistry, GU Guest House etc.), dusts from construction activities etc. are the sources of air pollution within the campus. A holistic approach is required to improve the air quality on a priority basis.

**Table 5: Monthly air quality data for the year 2016**

**Station:** Gauhati University (Dept. of Env. Sc.)

**Source:** MAPAN Programme (Department of Earth Science, Govt. of India; coordinated by IITM-Pune)

| Para-meters (Units) | Monthly Average Data for 2016 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CO (ppm) | 0.47 | 0.51 | 0.68 | 0.57 | 0.47 | 0.43 | 0.61 | 0.42 | 0.53 | 0.53 | 0.63 | 0.54 |
| $O_3$ (ppb) | 9.3 | 8.7 | 25.1 | 17.4 | 17.2 | 10.0 | 3.9 | 9.1 | 10.2 | 9.7 | 9.5 | 5.2 |
| $NO_2$ (ppb) | | 18.5 | 7.3 | 14.4 | 14.6 | 14.2 | 10.9 | 13.1 | 12.2 | 17.8 | 19.1 | 21.1 |
| Nox (ppb) | 24.4 | 28.1 | 13.8 | 18.1 | 18.1 | 15.7 | 15.1 | 20.4 | 20.8 | 28.0 | 31.5 | 35.4 |
| Black Carbon (ppb) | 8.2 | 8.3 | 8.0 | 8.9 | 6.6 | 6.7 | 4.3 | 6.3 | 5.5 | 7.7 | 6.83 | 7.9 |
| $PM_{2.5}$ (ppb) | 62.5 | 68.0 | 80.6 | 50.5 | 25.5 | 25.5 | 23.6 | 17.7 | 13.0 | 26.8 | 38.8 | 58.4 |
| $PM_{10}$ (ppb) | 121.0 | 121.0 | 185.7 | 127.9 | 55.5 | 51.4 | 50.2 | 43.8 | 51.4 | 64.5 | 76.1 | 111.9 |
| $CO_2$ (ppm) | 423.5 | 423.0 | 405.0 | 419.9 | 404.3 | 410.5 | 380.9 | 382.3 | 409.2 | 390.3 | 439.7 | 429.7 |
| $CH_4$ (ppb) | 2340.0 | 3077.0 | 3133.0 | 2053.9 | 2042.3 | 2220.0 | 2146.9 | 2134.8 | 2118.4 | 2188.3 | 19740.1 | 1782.0 |
| TNMHC (ppb) | 336.0 | 437.0 | 696.3 | 136.5 | 114.1 | 251.7 | 117.4 | 87.8 | 92.6 | 148.9 | 181.8 | 186.1 |
| Air Temperature ($^oC$) | 18.1 | 20.0 | 23.4 | 24.8 | 24.8 | 28.4 | 28.1 | 29.6 | 28.3 | 27.2 | 23.7 | 20.9 |
| R. H. (%) | 86.5 | 84.0 | 76.4 | 84.8 | 84.8 | 83.2 | 86.9 | 83.5 | 85.5 | 84.9 | 83.9 | 84.4 |
| Solar Radiation ($W/m^{2)}$ | 93.5 | 102.0 | 171.5 | 189.1 | 189.1 | 115.8 | 150.7 | 182.0 | 161.0 | 156.3 | 140.0 | 122.2 |
| Wind Speed (m/s) | 1.2 | 1.1 | 1.4 | 1.1 | 1.1 | 0.9 | 1.7 | 2.2 | 1.7 | 1.5 | 1.2 | 1.1 |

**Table** 6. SO2 measured monthly at the Department of Environmental Science, Gauhati University
**Source:** Pollution Control Board, Assam

| Parameters | Units | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SO2** | ppb | 8.82 | 47.85 | 9.20 | 7.60 | 6.39 | 7.11 | 5.90 | 7.90 | 6.95 | 6.78 | 9.95 | 10.22 |

**Table 7:** Annual average of air quality parameters
Source: Department of Environmental Science, Gauhati University

| Para-meters | Yearly Average | | | | CPCB Permissible Limits (Annual Average) |
|---|---|---|---|---|---|
| | 2016 | 2015 | 2014 | 2013 | |
| CO (in ppm) | 0.53 | 0.58 | 0.55 | 0.60 | 2.00 |
| $O_3$ (in ppb) | 409.86 | 420.50 | 418.55 | 412.80 | |
| $NO_2$ (in ppb) | 11.26 | 12.00 | 9.38 | 12.77 | 100.00 |
| Nox (in ppb) | 22.45 | 14.04 | 22.33 | 16.88 | |
| Black Carbon (in ppb) | 14.84 | NA | NA | NA | 40.00 |
| $PM_{2.5}$ (in ppb) | 3748.07 | 2076.00 | 2088.11 | 2076.00 | |
| $PM_{10}$ (in ppb) | 232.18 | 156.00 | 157.77 | 220.00 | |
| $CO_2$ (in ppm) | *40.90* | 36.75 | *61.88* | *62.55* | 40.00 |
| $CH_4$ (in ppb) | *88.36* | *84.50* | *114.44* | *116.33* | 60.00 |
| TNMHC (in ppb) | 89.58 | 6.70 | 6.50 | 3.00 | |
| Air Temperature ($^oC$) | 24.76 | 24.08 | 23.51 | 24.47 | |
| R. H. (%) | 84.06 | 72.38 | 82.42 | 82.00 | |
| Solar Radiation ($W/m^{2)}$ | 147.77 | 151.63 | 143.11 | 158.89 | |
| Wind Speed (m/s) | 1.34 | 1.75 | 1.55 | 0.80 | |

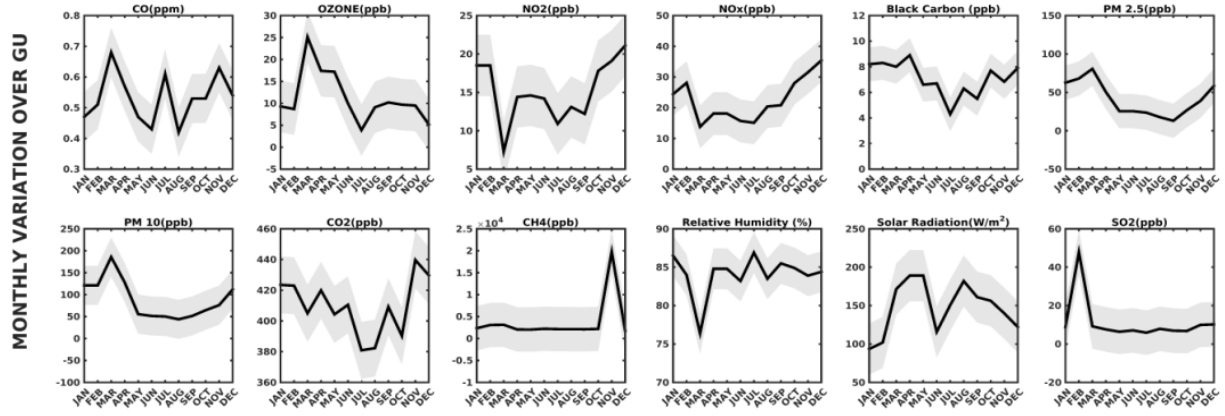



**Figure 12**: Plot of monthly air quality parameters

## Noise level

Day time noise levels were recorded at nineteen sites by the Department of Environmental Science, GU (Table 8, Figure 13). Considering the day time permissible limits of noise for Commercial, Residential and Silence zones (65, 55 and 50) respectively, it is observed that none of the sites measured are within these limits. Since the data recorded is only for one day, further repetitive observations are required to corroborate this findings including validation by another instrument.

**Table 8:** Noise Data in G. U. Campus (Source: Department of Environmental Science, GU)
Date of record: 13/04/2018

| Sl. No. | Site Name | Coordinates | Category of Area | $L_{eq}$ (Afternoon, 3-5 p. m.) | $L_{eq}$ (Morning, 7-9 a. m.) | Within permissible limit?(Yes/No) |
|---|---|---|---|---|---|---|
| 1 | GU Exit Gate_Seven Mile | 26 9’ 2”N; 91 39’ 25”E | Commercial | 76.5 | 60.2 | No |
| 2 | G.U. Main Gate | 26 9’ 16 N; 91 39’ 43 E | Commercial | 74.9 | 55.9 | No |
| 3 | G.U. Gate_ Sundarbari | 26 9’ 2 N; 91 39’ 55 E | Commercial | 76.5 | 64.7 | No |
| 4 | G.U. Entry Gate_Jalukbari | 26 9’ 28 N; 91 40’ 22 E | Commercial | 73.2 | 65.2 | No |
| 5 | SBI/GU Market | 26 9’ 18 N; 91 39’ 47 E | Commercial | 72.3 | 58.9 | No |
| 6 | Prof. Qtr. No. 3 | 26 9 28 N; 91 40 22E | Residential | 67.7 | 53.7 | No |
| 7 | VC's residence | 26 9 1 N; 91 40 11 E | Residential | 62.6 | 52.5 | No |
| 8 | GU Staff Qtr._Near Highway | 26 9 39 N; 91 40 18E | Residential | 71.1 | 57.8 | No |
| 9 | AT-8 Boys Hall | 26 9 21 N; 91 39 26E | Residential | 67.2 | 49.5 | No |
| 10 | RCC-4 Girls Hall | 26 9 29N; 91 40 00E | Residential | 59.7 | 46.5 | No |
| 11 | RCC-1 & 2 Boys' Hall | 26 9 11 N; 91 39 47 E | Residential | 62.2 | 56.6 | No |
| 12 | Gandhi Bhawan | 26 9 12 N; 91 40 03E | Residential | 66.9 | 47.6 | No |
| 13 | AT-7 Boys' Hall | 26 8 57N; 91 39 17 E | Residential | 72.9 | 45.1 | No |
| 14 | Zoology Department | 26 9 15 N; 91 39 32 E | Silence | 72.1 | 49.5 | No |
| 15 | K.K. Handiqui Library | 26 9 15 N; 91 39 32 E | Silence | 57.8 | 49.0 | No |
| 16 | Administrative Block | 26 9 19 N; 91 39 42 E | Silence | 69.2 | 56.5 | No |
| 17 | G.U. Model School | 26 9 19 N; 91 40 05 E | Silence | 84.8 | 52.5 | No |
| 18 | RADAR station | 26 8 54 N; 91 40 32 E | Silence | 70.5 | 45.1 | No |
| 19 | GU Hospital | 26 9 17 N; 91 39 54 E | Silence | 62.6 | 49.5 | No |

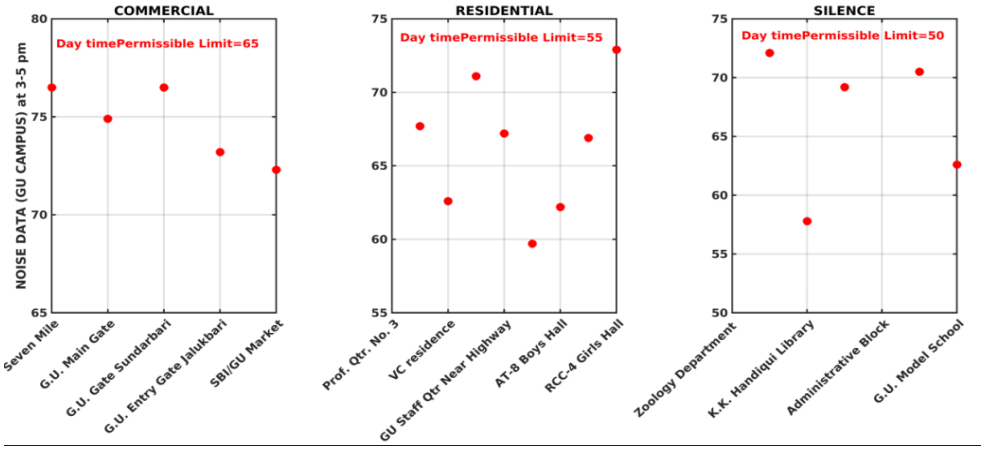



**Figure 13:** Plots of noise level at various sites in GU Campus

## Mode of transport

A preliminary survey was conducted by GU administration to assess the use of public and private transport as well as use of bicycles in the campus (Table 9). The sample survey involves 9 academic departments consisting of 86 faculty members, 79 non teaching staff and 994 students . With this limited sample size it was found that almost all the faculty members use private vehicles and same is the case with the nonteaching staff (including two wheeler users). Only about 40% of the total people (in this survey) use public transport while pooling of vehicle and bicycle users are abysmally low.

Although the total sample size is not of desirable proportion, this survey is indicative of the fact that carbon footprint by the university community is expected to be high. To ameliorate this situation, a number of steps may be undertaken including, but not limited to, addition to the existing fleet of university bus service, intra campus shuttle services with battery operated auto or minibus, promote use of cycle and construction of cycle stands at every block/academic departments/hostels etc., promoting pool car for city dwellers.

**Table 9:** Mode of transport availed by the university community

| Sl No. | Department/ Block | Faculty Members | Officers/ Staff | Student | Dept. Vehicle | Members with Vehicles | Members using public transport | Members using Bicycles | Pooling Vehicle/ walking |
|---|---|---|---|---|---|---|---|---|---|
| 1 | History | 12 | 3 | 120 | | 13 | 2 | | |
| 2 | Women's Studies | 11 | 4 | 56 | 5 | 6 | 34 | | 19 |
| 3 | Sociology | 5 | 2 | 87 | | 12 | 51 | 2 | |
| 4 | Botany | 13 | 18 | 130 | | 12 | 135 | 7 | |
| 5 | Electronic & Comm Engg | 7 | 7 | 272 | 8 | 8 | 4 | 2 | |
| 6 | Computer Science | 12 | 4 | 95 | | 19 | 90 | 2 | |
| 7 | Applied Sciences | 10 | 9 | 70 | | 40 | 30 | 15 | 5 |
| 8 | Instrumentation & USIC | 6 | 28 | 46 | | 56 | 20 | 4 | |
| 9 | English | 10 | 4 | 118 | | 14 | 100 | | |

## Implementing office automation and moving towards paperless office

As part of green practices initiatives have been taken to move towards paperless transactions at all possible levels for which advisory has been sent from the office of the Registrar, GU to various academic departments and administrative units. Various notices and internal circulations are already processed through the GU web portal. Complete digital process in the admissions, both UG and PG since 2018 through the dedicated GUIUMS has substantially reduced use of papers. It is worth mentioning that nearly 2,80000 UG students and about 2800 PG students (as per 2017admission record) would otherwise require use of a huge quantum of papers for the formalities that has been completely wiped out through the online system at present. Efforts are also on for automation of the financial transactions, introducing e-tendering shortly along with developing a complete digital inventory of physical assets which will further reduce use of papers.

A digital geospatial database of the campus has already been created through a professional survey completed in 2015 which has greatly facilitated landuse management in the campus.

## Recommendations:

Keeping in view this rapid and limited assessment the following recommendations are made for compliance:

- There should be periodic green audit to improve upon the overall environmental health in the campus
- Mechnaism and policy should be in place for effective garbage collection & solid waste management system including source segregation of different types of wastes, suitable disposal of hazardous lab material and e-wastes. Proper procedure should be followed for disposal of various chemicals in many science departments. A set of guidelines need to be issued for the purpose.
- There should be regular exercise of removal of uprooted tree, tree branches etc. from the University campus.
- Massive organised plantation is required to increase the greenery in the campus particularly in view of uprooting of numerous trees during premonsoon and monsoon storms.
- Presently the growth in built up areas has resulted in shrinkage of the wetlands. Considering that conservation of these wetlands is vital for maintaining the rich biodiversity and unique landscape environment further filling up of the wetlands should be avoided. A regular update on landuse change should be carried out as part of the periodic green audit. A campus master plan for next 25 years should be prepared on a priority basis employing professional services and taking on board all the relevant stakeholders. The campus geospatial database available at the Office of the Supdtg. Engineer can be used as a base data for planning the future landuse.
- High amount of sediments arising out of de siltation of Brahmaputra water at the treatment plant usually find their way into the surrounding wetlands, thus causing aggradation and consequent inundation in peripheral areas. This may pause danger to the wetland ecosystem and its carrying capacity. Necessary action therefore, is called for suitable disposal of these sediments, away from the wetlands.
- Urgent action need to be initiated for identification and deportation of unauthorized occupants in the and encroachers in forest areas of the campus.
- Rainwater harvesting should be part of the plan for all future buildings/structures alongwith provisions for installation of solar panels. The concept of "Green Building" should be adopted following the "GRIHA" scheme.
- Energy audit need to be carried out on a priority basis in different administrative units/blocks, academic departments, hostels and other installation and utilization of power clearly worked out as already done in case of lighting arrangement.
- Although GUIUMS has greatly facilitated automation in some aspects of the academic management, a robust smart campus management system with provision for real time monitoring of inventory and operations should be planned for. This will maximise paperless transactions in the university
- Fire extinguishers are scarce in the campus which needs immediate attention.
- Bicycle stands may be constructed at suitable locations in academic departments and hostels to promote use of cycles in the campus.
- A Core Advisory Committee may be constituted for identification of all problems related to maintaining Green Campus and also to help university authority to resolve these problems

**Annexure I**
**Biodiversity in the Gauhati University Campus**

## Mammalian diversity
## Total No. of Mammalian Species: 22 Nos.

| S/No. | Common Name | Scientific Name |
|---|---|---|
| 1 | Common Leopard | *Panthera pardus* |
| 2 | Fishing Cat | *Prionailurus viverrinus* |
| 3 | Indian Jackal | *Canis aureus indicus* |
| 4 | Slow Loris | *Nycticebus coucang* |
| 5 | Monkey | *Macaca mullata* |
| 6 | Common Palm Civet | *Paradoxurus hermaphrodites* |
| 7 | Small Indian Civet | *Viverricula indica* |
| 8 | Large Indian Civet | *Viverra zibettha* |
| 9 | Mongoose | *Helogale parvula* |
| 10 | Himalayan Hoary- bellied Squirrel | *Callosciurus pygerythrus* |
| 11 | Lesser Bandicoot-Rat | *Bandicota bengalensis* |
| 12 | Large Bandicoot-Rat | *Bandicota indica* |
| 13 | House Rat | *Rattus rattus* |
| 14 | House Mouse | *Mus musculus* |
| 15 | House Shrew | *Suncus murinus* |
| 16 | Savi's Pygmy Shrew | *Suncus etruscus* |
| 17 | Himalayan Crestless Porcupine | *Hystrix brachyuran* |
| 18 | Indian Flying Fox | *Pteropus giganteus* |
| 19 | Asiatic Greater Yellow House Bat | *Scotophilus heathii* |
| 20 | Mount Popa Pipistrelle | *Pipistrellus paterculus* |
| 21 | Javan Pipistrelle | *Pipistrellus javanicus* |
| 22 | Least Pipistrelle | *Pipistrellus tenuis* |

## Avian diversity
## Total No. of Bird species: above 149

| Family | Common Name | Scientific Name |
|---|---|---|
| **1. Phalacrocoracidae** | Little Cormorant | *Phalacrocorax niger* |
| | Great Cormorant | *P. carbo* |
| **2.Ardeidae** | Grey Heron | *Ardea cinerea* |
| | Purple Heron | *A. purpurea* |
| | Indian Pond Heron | *Ardeola grayii* |
| | Cattle Egret | *Bubulcus ibis* |
| | Intermediate Egret | *Mesophoyx intermedia* |
| | Little Egret | *Egretta garzetta* |
| | Great Egret | *Ardea alba* |
| | Black Crowned Night Heron | *Nycticorax nycticorax* |
| | Cinnamon Bittern | *Ixobrychus cinnamomeus* |
| | Black Bittern | *Ixobrychus flavicollis* |
| **3. Ciconidae** | Lesser Adjutant Stork | *Leptoptilos javanicus* |
| | Greater Adjutant stork | *Leptoptilos dubius* |
| | Asian Openbill Stork | *Anastomus oscitans* |
| **4. Dendrocygnidae** | Fulvous Whistling Teal | *Dendrocygna bicolour* |

| | | |
|---|---|---|
| | Lesser Whistling Teal | *D. javanica* |
| **5.Anatidae** | Ruddy Shelduck | *Tadorna ferruginea* |
| | Garganey | *Anas querquedula* |
| | Red Crested Pochard | *Netta rufina* |
| | Common Pochard | *Aythya farina* |
| | Gadwall | *Anas strepera* |
| | Eurasian Wigeon | *Anas Penelope* |
| | Northern Pintail | *Anas acuta* |
| | Common Teal | *Anas crecca* |
| | Northern Shoveler | *Anas clypeata* |
| **6.Rallidae** | Water Rail | *Rallus aquaticus* |
| | Whitebrested Waterhen | *Amaurornis phoenicurus* |
| | Common Moorhen | *Gallinula chloropus* |
| | Water Cock | *Gallicrex cinerea* |
| **7. Jacanidae** | Bronze Winged Jacana | *Metopidius indicus* |
| **8.Charadriidae** | Red-wattled Lapwing | *V. indicus* |
| **9. Scolopacidae** | Common Snipe | *Gallinago gallinago* |
| | Solitary Snipe | *Gallinago solitaria* |
| | Common Sandpiper | *Actitishypoleucos* |
| ***10.Rostratulidae*** | Painted Snipe | *Rostratula benghalensis* |
| **11. Accipitridae** | Black Kite | *Milvus migrans* |
| | Longbilled Vulture | *G. indicus* |
| | Griffon Vulture | *Gyps fulvus* |
| | Red-headed Vulture | *Sarcogyps calvus* |
| | White-rumped vulture | *Gyps bengalensis* |
| | Eurasian Sparrow Hawk | *Accipiter nisus* |
| | Besra | *Accipiter virgatus* |
| | Shikra | *Accipiter badius* |
| | Pied Harrier | *Circus melanoleucos* |
| | Crested Serpent Eagle | *Spilornis cheela* |
| **11.Columbidae** | Oriental Turtle Dove | *Streptopelia orientalis* |
| | Spotted Dove | *S. chinensis* |
| | Eurasian Collard Dove | *S. decaocto* |
| | Emerald Dove | *Chalcophaps indica* |
| | Yellowfooted Green Pigeon | *T. phoeniccoptera* |
| | Green Imperial Pigeon | *Ducula aenea* |
| **12.Psittacidae** | Alexandrine Parakeet | *Psittacula eupatria* |
| | Rose-ringed Parakeet | *P. krameri* |
| | Redbrested Parakeet | *P. alexandri* |
| **13. Eopsaltridae** | Greyheaded Canary-Flycatcher | *Culicicapa ceylonensis* |
| **14. Apodidae** | Asian palm swift | *Cyepsiurus balasiensis* |
| | Himalayan Swiflet | *Collaclia brevirostris* |
| | House Swift | *Apus nipalensis* |
| **15.Camprimulgidae** | Large-tailed Nightjar | *Camprimulgus macrurus* |
| **16. Strigidae** | Spotted Owlet | *Athene brama* |
| | Collared Scops Owl | *Otus (bakkamoena)lettia* |
| | Asian Barred Owlet | *Glaucidium cuculoides* |
| | | |
| | Brown Fish Owl | *Ketupa zeylonensis* |
| | Brown Hawk Owl | *Ninox scutulata* |
| **17. Tytonidae** | Barn Owl | *Tyto alba* |
| **18. Picidae** | Greater Flameback | *Chrysocolaptes lucidus* |

| | | |
|---|---|---|
| | Lesser Goldenback | *Dinopium benghalensis* |
| | Fulvous-breasted Woodpecker | *D. macei* |
| | Grey-faced Woodpecker | *Picus canus* |
| | Yellow-crowned Woodpecker | *Dendrocopos mahrattensis* |
| | Rufous Woodpecker | *Micropternus brachyurus* |
| **19. Megalaimidae** | Lineated Barbet | *Megalaima lineata* |
| | Bluethroated Barbet | *M. asiatica* |
| | Coppersmith Barbet | *M. haemacephala* |
| **20.Upupidae** | Eurasian Hoopoe | *Upupa epops* |
| **21.Coracidae** | Indian Roller | *Coracias benghalensis* |
| **22. Alcedinidae** | Common Kingfisher | *Alcedo atthis* |
| **23. Dacelonidae** | Stork-billed Kingfisher | *Pelargopsis capensis* |
| | White-throated Kingfisher | *Halcyon smyrnensis* |
| **24. Cerylidae** | Pied Kingfisher | *Ceryle rudis* |
| **25. Meropidae** | Little Green Bee-eater | *Merops orientalis* |
| | Blue-tailed Bee-eater | *M. philippinus* |
| **26. Cuculidae** | Pied Cuckoo | *Oxylophus jacobinus* |
| | Greater Cuocal | *Centropus chinensis* |
| | Lesser Coucal | *Centropusbengalensis* |
| | Common Hawk-Cuckoo | *Heirococcyx varius* |
| | Indian Cuckoo | *C. micropterus* |
| | Common Cuckoo | *C. canorus* |
| | Asian Koel | *Eudynamys scolopacea* |
| | Green-billed Malkoha | *Rhopodytes tristis* |
| | Plantative Cuckoo | *Cacomantis merulinus* |
| | Eurasian Cuckoo | *Cuculus canorus* |
| | Common Hawk Cuckoo | *Hierococcyx varius* |
| | Chestnut-winged Cuckoo | *Clamator coromandus* |
| **27. Irenidae** | Goldenfronted Leafbird | *C. aurifrons* |
| **28. Lanidae** | Longtailed Shrike | *Lanius schach* |
| | Brown Shrike | *L. cristatus* |
| | Greybacked Shrike | *L. tephronotus* |
| **29. Corvidae** | Rufous Treepie | *Dendrocitta vagabunda* |
| | House Crow | *Corvus splendens* |
| | Jungle Crow | *C. levaillantii* |
| | Blackhooded Oriole | *O. xanthornus* |
| | Large Hawk-cuckoo | *Coracina macei* |
| | Common Iora | *Aegithina tiphia* |
| | Scarlet Minivet | *P. flammeus* |
| | Greater Racket-tailed Drongo | *Dicrurus paradiseus* |
| | Haircrested Drongo | *D. hottentottus* |
| | Lesser Racket-tailed Drongo | *D. remifer* |
| | Black Drongo | *D. macrocercus* |
| | Bronzed Drongo | *D. aeneus* |
| | Whitethroated Fantail | *R. albicollis* |
| **30.Muscicapidae** | Grey headed canary flycatcher | *Culicicapa ceylomensis* |
| | Oriental Magpie robin | *Copsychus saulairs* |
| | Shama | *Copsychus malabaricus* |

| | | |
|---|---|---|
| | Common Stonechat | *Saxicola torquata* |
| | Tailor Bird | *Orthotomus sutorius* |
| | Aberrant Bush Warbler | *Cettia flavolivacea* |
| | Blue Whistling Thrush | *Myophonus caeruleus* |
| | Orange-headed Thrush | *Zoothera citrina* |
| **31. Sturnidae** | Chestnut-tailed Starling | *Sturnus malabaricus* |
| | Asian Pied Starling | *S. contra* |
| | Common Myna | *Acridotheres tritis* |
| | Jungle Myna | *A. fuscus* |
| | Hill Myna | *Gracula religiosa* |
| | Great Myna | *Acridotheres grandis* |
| **32. Paridae** | Great Tit | *Parus major* |
| **33. Hirundinidae** | Barn Swallow | *Hirundo rustica* |
| **34. Pycnonotidae** | Redvented Bulbul | *P. cafer* |
| | Black Bulbul | *Hypsipetes leucocephalus* |
| | Red Whiskered Bulbul | *Pycnonotus jocosus* |
| **35. Sylviidae** | Common Tailorbird | *Orthotomus sutorius* |
| | Dusky Warbler | *Phylloscopus collybita* |
| | Tickell's Leaf Warbler | *P. affinis* |
| | Striated Marsh Warbler | *Megalurus palustris* |
| **36.Timalidae** | Marsh Babbler | *Pellorneum palustre* |
| | Jungle Babbler | *Turdoides striatus* |
| **37. Nectarinidae** | Purple rumped sunbird | *Leptocoma zeylonica* |
| | Crimson sunbird | *Aethopyga siparaja* |
| **38. Dicaeidae** | Scarletbacked Flowerpecker | *Dicaeum cruentatum* |
| **39.Passeridae** | House Sparrow | *Passer domesticus* |
| | Tree Sparrow | *p. montanus* |
| | White Wagtail | *Motacilla alba* |
| | Citrine Wagtail | *M. citreola* |
| | Paddyfield Pipit | *Anthus rufulus* |
| | Scalybreasted Munia | *L. punctulata* |
| | White Rumped Munia | *L. striata* |
| | Olive Backed Pipit | *Anthus hodgsoni* |

## 3.Amphibian diversity of Gauhati University Campus

Total No. Amphibian Species:5

| S/No. | Common name | Scientific Name |
|---|---|---|
| 1. | Assam Forest Frog-Family(Ranidae) | *Sylvirana leptoglossa* |
| 2. | Bhamo Frog-Family (Ranidae) | *Humerana humeralis* |
| 3. | Common Asian Toad-Family(Bufonidae)- | *Duttaphrynus melanostictus* |
| 4. | Common Tree Frog-Family(Rhaphoridae) | *Polypedates teraiensis* |
| 5. | Indian Bull Frog-Family(Ranidae)- | *Haplobatrachus tigerina* |

## 4.Reptilian diversity
## Total No. of Snake Species: 11

| S/No. | Common name | Scientific Name |
|---|---|---|
| 1. | White Lipped Pit Viper(Family-Viperidae) | *Cryptelytrops albolabris* |
| 2. | Red-necked Keelback (Family-Colubridae) | *Rhabophis subminiatus* |
| 3. | Monocled Cobra(Family-Elapidae) | *Naja kaouthia Lesson* |
| 4. | Copper-headed Trinket Snake(Family-Colubridae) | *Coelognathus radiates* |
| 5 | Common Wolf Snake(Family-Colubridae) | *Lycodon aulicus* |
| 6. | Indian Rat Snake(Family-Colubridae) | *Ptyas mucosa* |
| 7. | Brahmioni Blind- Snake(Family-Typhlopidae) | *Ramphotyphlops braminus* |
| 8. | Ornate Flying Snake(Family-Colubridae) | *Chrysopela ornate* |
| 9. | Indian python (Family – Pythonidae) | *Python molurus* |
| 10. | Chekered keelback | *Xenochrophis piscator* |
| 11. | Water Snake | *Nerodia sipedon* |

### b) Total No. of Lizard Species: 12

| S/No. | Common Name | Scientific Name |
|---|---|---|
| 1. | Tokay gecko | *Gecko gecko* |
| 2. | Common house gecko | *Hemidactylus frenatus* |
| 3. | Oriental garden lizard | *Calotes versicolor* |
| 4. | Monitor Lizard | *Varanus bengalensis* |
| 5. | Common garden Skink | *Lampropholis guichenoti* |
| 6 | House Lizard | *Hemidactylus frenatus* |
| 7 | Flat Tailed Gecko | *Hemidactylus platyurus* |
| 8 | Garnot's House Gecko | *Hemidactylus garnotii* |
| 9 | White-spotted Supple Skink | *Lygosoma albopunctata* |
| 10 | Spotted forest skink | *Sphenomorphus maculatus* |
| 11 | Indian Forest Skink | *Sphenomorphus indicus* |
| 12 | East Indian brown Mabuya/ Many striped Skink | *Eutropis multifasciata* |

### Total No. of Turtle Species: 5

| Si no | Common name | Scientific Name |
|---|---|---|
| 1. | Sotted pond turtle | *Geoclemys hecumiltonii* |
| 2. | Indian tent turtle | *Pangsura tentoria* |
| 3. | Indian eyed turtle | *Morenia petersi* |
| 4. | Indian soft shell turtle | *Nilssonia gangeticus* |
| 5. | Peacock soft shell turtle | *Nilkssonia hurum* |
| | | |

**Butterfly diversity of Gauhati University Campus**
**Total No. of Butterfly Species: 147**

| Family/ Subfamily | Common Name | Scientific Name |
|---|---|---|
| **Nymphalidae/Amathusinae** | Common Duffer | *Discophora sondiaca zal Westwood* |
| **Satyrinae** | Common Evening Brown | *Melanitis leda ismene (Cramer)* |
| | Dark Evening Brown | *Melanitis phedima bela, Moore* |
| | Common Palmfly | *Elymnias hypermnestra undularis (Drury)* |
| | Spotted Palmfly | *Elymnias malelas malelas (Hewitson)* |
| | Bluestriped Palmfly | *Elymnias patna patna (Westwood)* |
| | Bamboo Treebrown- | *Lethe europa niladana, Fruhstorfer* |
| | Banded Trebrown- | *Neope confusa confusa, Aurivillius* |
| | Common Bushbrown- | *Mycalesis perseus blasius (Fabricius)* |
| | Darkbrand Bushbrown- | *Mycalesis mineus mineus (Linnaeus)* |
| | Nigger- | *Orsotrioena medus medus (Fabricius)* |
| | Common Fivering- | *Yapthima baldus baldus (Fabricius)* |
| | Chinese Bush Brown | *Mycalesis gotoma* |
| **Charaxinae** | Tawny Rajah- | *Charaxes polyxena hierax, Felder* |
| | Yellow Rajah- | *Charaxes marmax, Westwood* |
| | Scarce tawny Rajah- | *Charaxes aristigiton aristigiton Fabricius* |
| | Common Nawab- | *Polyura athamas athamas (Drury)* |
| | Variegated Rajah | *C. kaharuba Moore* |
| **Nymphalinae** | Angled Castor- | *Ariadne ariadne pallidior (Frusthorfer)* |
| | Common Castor- | *Ariadne merione assama (Evans)* |
| | Common Leopard | *Phalanta phalantha (Drury)* |
| | Large Yeoman- | *Cirrochroa aoris aoris Doubleday* |
| | Common Yeoman- | *Cirrochroa tyche mithila, Moore* |
| | Vagrant- | *Issoria sinha sinha (Kollar)* |
| | Indian Fritilary- | *Argyreus hyperbius hyperbius (Johans)* |
| | Lemon Pansy- | *Precis lemonias lemonias (Linnaeus)* |
| | Peocock Pansy- | *Precis almana almana (Linnaeus)* |
| | Grey Pansy- | *Precis atlites atlites (Johanssen)* |
| | Chocolate Soldier- | *Precis iphita iphita (Cramer)* |
| | Common Jester- | *Symbrenthia lilaea khasiana, Moore* |
| | Great Eggfly- | *Hypolimnas bolina (Linnaeus)* |
| | Orange Oakleaf- | *Kallima inachus inachus (Boisduval)* |
| | Common Sailer- | *Neptis hyla varmona, Moore* |
| | Great Eggfly | *Hypolimnas bolina (Linnaeus)* |
| | Common Sailer- | *Neptis sappho adara,* ***Moore*** |
| | Yerburi's Sailer- | *Neptis yerburi sikkima,* ***Evans*** |
| | Sullied sailer | *N. soma soma (****Moore****)* |

| | | |
|---|---|---|
| | Short banded Sailer- | *P. columella ophian,Moore* |
| | Yellow Jack sailer | *Lassipa v. viraja (Moore)* |
| | Common Lascar- | *Pantoporia hordonia hordonia (Stoll)* |
| | Orange Staff Sergeant- | *Parathyma cama (Moore)* |
| | Colour Sergeant- | *P. nefte inara, Db* |
| | Common Sergeant- | *P. perius (Linnaeus)* |
| | Commander- | *Moduza p. procris (Cramer)* |
| | Knight- | *Lebadea martha ismene, Db & Hew* |
| | Grey Count- | *Tinacea lepidea lepidea, But* |
| | Grey Count- | *T. l. miyana, Fruh* |
| | Common Baron | *Euthalia aconthea suddhodana (Frusth.)* |
| | Streaked Baron- | *E. jama jamida,Fd.* |
| | Pasha | *Herona marathus* Doubleday |
| | Courtesan | *Euripus nyctelius* (Doubleday) |
| | Red Spot Duke | *Dophla evalina* (Stol) |
| | Plain Earl | *Tanaecia jahnu(*Moore*)* |
| **Heliconiinae** | Leopard Lacewing- | *Cethosia cyane, Drury* |
| | Red Lacewing- | *C. biblis tisamena, Fabricius* |
| | Cruiser(Female) | *Vindula erota* |
| **Acrainae** | Yellow Coster- | *Pareba vesta,F* |
| **Danainae** | Glassy Tiger- | *Parantica aglea melanoides, (M)* |
| | Blue Tiger- | *Tirumala limniace leopardus, (Butler)* |
| | Dark Blue Tiger- | *T. septentrionis,(But)* |
| | Common Tiger- | *Danaus genutia, (Cramer)* |
| | Plain Tiger- | *D. chrysippus,L* |
| | Striped Blue Crow- | *Euploea mulciber mulciber, Cr* |
| | Longbanded Blue Crow- | *Euploea algae deione, Wd* |
| | Blue Kingcrow- | *E. klugii klugii, M* |
| | Common Crow- | *E. core core, Cr* |
| **Papilionidae/ Papilioninae** | Common Jay- | *Graphium doson axion (Feld.,C.&R.)* |
| | Tailed Jay- | *G.a. agammemnon (Lin.)* |
| | Common Bluebottle- | *Graphium s. sarpedon (Lin.)* |
| | Glassy Bluebottle- | *Graphium cloanthus (Westwood)* |
| | Common Rose- | *Pachliopta a. aristolochiae (Fab.)* |
| | Crimson Rose- | *Pachliopta hector**(Linn)*** |
| | Common Birdwing- | *Troides helena cereberus (C.&R., Feld.)* |
| | Common Mime- | *Chilasa clytia clytia (Lin.)* |
| | Common Mime- | *Chilasa clytia dissimilis(Lin.)* |
| | Common Mormon- | *Princeps polytes romulus (Cramer)* |
| | Great Mormnon- | *P. memnon agenor (Lin.)* |
| | Common Raven- | *P. castor polas (Jordan)* |
| | Red Helen- | *P. h. helenus (Lin.)* |
| | Lime Butterfly- | *Princeps demoleus (Lin.)* |
| **Lycanidae/ Miletinae** | Apefly | *Spalgis e. epius (Westwood)* |
| **Lycaeninae** | Golden Saphire | *Heliophorus brahma (Moore)* |
| **Curetinae** | *Angled Sunbeam-* | *Curetis dentata Moore* |
| **Theclinae** | *Common Acacia Blue* | *Surendra q. quercetorum (Moore)* |
| | *Centaur Oakblue-* | *Nilasera centaurus* |

| | | |
|---|---|---|
| | | *pirithous(Moore)* |
| | *Yamfly* | *Loxura atymnus continentalis(Fruhsto)* |
| | *- Common Red Flash* | *Rapala jarbas jarbas (Fabricius)* |
| | *Longbanded Silverline* | *Spindasis lohita himalayanus (Moore)* |
| **Polyommatinae** | *Common Cerulean* | *Jamides c. celeno (Cramer)* |
| | *Metallic Cerulean* | *J. alecto eurysaces (Frushtorfer)* |
| | *Peablue* | *Lampides boeticus (Linnaeus)* |
| | *Grass Jewel* | *Zizeeria t. trochilus (Freyer)* |
| | *Margined Hedge Blue* | *Lycaenopis marginata (De Niceville)* |
| | *Quaker* | *Neopithecops zalmora (Butler)* |
| | *Gram Blue* | *Euchrysops cnejus (Fabricius)* |
| | *Angled Pierrot* | *Caleta caleta* Hewitson |
| | *Common Pierrot* | *Castalius r. rosimon (Frushtorfer)* |
| | *Dark Pierrot* | *Tarucus ananda (De Niceville)* |
| | *Striped Pierrot* | *T. nara (Kollar)* |
| | *Lime Blue* | *Chilades laius (Cramer)* |
| | *Pale Grass Blue* | *Pseudozizeeria maha (Kollar)* |
| | *Forget-Me-not* | *Catochrysops strabo (Fabricius)* |
| | *Common Hedge Blue* | *Acetolepsis puspa gisca (Frushtorfer)* |
| | *Plains Cupid* | *Edales pandava (Horsfield)* |
| **Riodininae** | *Punchinello* | *Zemeros flegyas indicus (Fabricius)* |
| | *Plum Judy* | *Abisara echerius suffuse (Moore)* |
| **Pyrginae** | *Common Spotted Flat* | *Celaenorrhinus leucocera (Kollar)* |
| | *Fulvous Pied Flat* | *Coladenia dan festa (Evans)* |
| | *Chestnut Angle* | *Odontoptilum a. angulata (Felder)* |
| | *Common Bush Hopper* | *Ampittia dioscorides (Felder)* |
| **Hesperiidae/Hesperiinae** | Chestnut Bob- | *Iambrix s. salsala (Moore)* |
| | Chocolate Demon- | *Ancistroides nigrita diocles(Moore)* |
| | Spotted Demon- | *Notocrypta fiesthamelii alysos Moore* |
| | Assam Darter- | *Ochlodes s. siva(Moore)* |
| | Restricted Demon | *Notocrypta curvifascia* |
| | Spotted Demon | *N. fiesthamelii alysos (Moore)* |
| | Indian Palm Bob | *Suastus g. gremius (Fabricus)* |
| | Paintbrush Swift | *Baoris farri (Moore)* |
| | Purple And Gold Flitter | *Zographetus satwa (De Niceville)* |
| | Grass Demon- | *Udaspes folus (Cramer)* |
| | Wax Dart- | *Cupitha purreea Moore* |
| | Blank Swift- | *Caltoris kumara (Moore)* |
| | Giant Redeye- | *Gangara t. thyrsis(Fab.)* |
| | Common Redeye- | *Matapa aria (Moore)* |
| | Common Dartlet- | *Oriens gola pseudolus (Mabille)* |
| | Coon- | *Sancus fuligo (Mabille)* |
| **Pieridae/ Pierinae** | Psyche- | *Leptosia n. nina (Fab.)* |
| | Indian Cabbage White- | *Pieris canidia indica Evans* |
| | Large Cabbage White | *P. brassicae nepalensis (Gray)* |
| | Chocolate Albatross- | *Appias lyncida elenora (Boisduval)* |
| | Common Albatross | *A. albino darada (C&R, Felder)* |
| | Striped Albatross | *A. libythea (Fabricius)* |

| | | |
|---|---|---|
| | Yellow Orange Tip- | *Ixias pyrene familiaris Butler* |
| | Common Gull- | *Cepora n. nerissa (Fab.)* |
| | Lesser Gull- | *C. n. nadina (Lucas)* |
| | Great Orange Tip- | *Hebomoia glaucippe (Lin.)* |
| | Common Jezebel- | *Delias eucharis (Drury)* |
| | Redbase Jezebel- | *D. a.aglaia (Lin.)* |
| | Redspot Jezebel- | *D.d. descombesi (Boisduval)* |
| | Painted jezebel- | *D. hyparete indica Wallace* |
| **Coliadinae** | Common Emigrant- | *Catopsila pomona (Fab.)* |
| | Mottled Emigrant- | *C. pyranthe (Lin.)* |
| | Tree Yellow- | *Gandaca harina assamica Moore* |
| | Small Grass Yellow- | *Eurema brigitta rubella Wallace* |
| | Common Grass Yellow- | *E. hecabe contubernalis (Moore)* |
| | Three Spot Grass Yellow- | *E. blanda silhatana (Wallace)* |
| | One-Spot Grass Yellow | *E. a. andersoni (Moore)* |

## 6.Odonate diversity of Gauhati University Campus

**Total no. of Odonate Species: 48**

**a) No. of Anisoptera (Dragonfly):28**

| SL. NO. | COMMON NAME | SCIENTIFIC NAME |
|---|---|---|
| 1 | Common Clubtail | *Ictinogomphus rapax* |
| 2 | Blue Darner | *Anax immaculiforns* |
| 3 | Parakeet Darner | *Gynancantha bayedera* |
| 4 | Common picture wing | *Rhyothemis variegate* |
| 5 | Fulvous forest skimmer | *Neurothemis fulvia* |
| 6 | Blue tailed forest hawk | *Orthetrum triangulare* |
| 7 | Trumpet tail | *Acisoma panorpoides* |
| 8 | Ruddy marsh skimmer | *Crocothemis servilia* |
| 9 | Coral tailed cloud wing | *Tholymis tillarga* |
| 10 | Rufous marsh glider | *Rhodothemis rufa* |
| 11 | Pied paddy skimmer | *Neurothemis tullia* |
| 12 | Scarlet marsh hawk | *Aethriamanta brevipennis* |
| 13 | Ground skimmer | *Diplocodes trivialis* |
| 14 | Black tipped ground skimmer | *Diplocodes nebulosa* |
| 15 | Blue marsh hawk | *Orthetrum glaucum* |
| 16 | Green marsh hawk | *Orthetrum sabina* |
| 17 | Ditch jewel | *Brachythemis contaminata* |
| 18 | Crimson-tailed marsh hawk | *Orthetrum pruinosum* |
| 19 | Rufous backed marsh hawk | *Brachydiplax chalybea* |
| 20 | Little blue marsh hawk | *Brachydiplax sobrina* |
| 21 | Emerald flanked marsh hawk | *Brachydiplax farinosa* |
| 22 | Asiatic bloodtail | *Lathrecista asiatiica* |
| 23 | Tricoloured marsh hawk | *Orthetrum luzonicum* |
| 24 | Wandering glider | *Pantala flavescens* |
| 25 | Yellow tailed ashy skimmer | *Potamarcha congener* |
| 26 | Black stream glider | *Thithemis festiva* |
| 27 | Long legged marsh glider | *Trithemis pallidinervis* |
| 28 | Blue tailed yellow skimmer | *Palpopleura sexmaculata* |

**b) No. of Zygoptera (Damselfly): 20**

| SL. NO. | COMMON NAME | SCIENTIFIC NAME |
|---|---|---|
| 1 | White dartlet | *Agriocnemis pieris* |
| 2 | Pigmy dartlet | *Agriocnemis pygmaea* |
| 3 | Indian hooded dartlet | *Agriocnemis kalinga* |
| 4 | Golden dartlet | *Ischnura aurora* |
| 5 | Milky dartlet | *Agriocnemis lacteola* |
| 6 | Orange tailed marsh dart | *Ceriagrion cerinorubellum* |
| 7 | Coromandel marsh dart | *Ceriagrion coromandelianum* |
| 8 | Rusty marsh dart | *Ceriagrion olivaceum* |
| 9 | Black tailed marsh dart | *Ceriagrion fallax* |
| 10 | Saffron faced blue dart | *Pseudagrion rubriceps* |
| 11 | Elegant sprite | *Pseudagrion decorum* |
| 12 | Black marsh dart | *Onychargia atrocyana* |
| 13 | Pruinosed dartlet | *Agriocnemis femina* |
| 14 | Blue dart | *Pseudagrion microcephalum* |
| 15 | | *Mortonagrion aborense* |
| 16 | Pied bush dart | *Pseudocopera ciliata* |
| 17 | Blue bush dart | *Copera vittata* |
| 18 | Orange marsh dart | *Ceriagrion rubiae* |
| 19 | Yellow bush dart | *Copera marginipes* |
| 20 | | *Agriocnemis pallidum* |

**7. Spider diversity of Gauhati University**
**Total No. of Spider Species: 40**

| S/No | Family | Scientific Name/(Common name) |
|---|---|---|
| 1 | Araneidae | *Argiope pulchella*(Garden Cross spider) |
| 2 | | *Argiope catenulata*(Grass Cross spider) |
| 3 | | *Araneus mitificus*(Kidney Garden spider) |
| 4 | | *Cyclosa bifida*(Trashline orbweaver) |
| 5 | | *Cytrophora citricola*(Tropical Tent web spider) |
| 6 | | *Eriovixia excelsa*(Dark Bird dropping spider) |
| 7 | | *Gasteracantha kuhli*(Spiny orb weaver) |
| 8 | | *Neoscona mukerjei*(Common Garden spider) |
| 9 | | *Neoscona bengalensis* |
| 10 | | *Arachnura* sp. (Scorpion tailed spider) |
| 11 | | *Nephila pilipes*(Giant Golden Orb-weaver) |
| 12 | | *Nephila maculata*(Giant Wood spider) |
| 13 | Eutichuridae | *Cheiracanthium* sp. (Yellow sac spider) |
| 14 | Oxyopidae | *Oxyopes shweta*(White Lynx spider) |
| 15 | | *Oxyopes javanus*(Lynx spider) |
| 16 | | *Hamadruas sikkimensis* |

| | | |
|---|---|---|
| 17 | Pholcidae | *Artema atlanta* |
| 18 | | *Pholcus* sp. (Cellar spider) |
| 19 | | *Crossopriza lyoni* |
| 20 | Pisauridae | *Perenethis* sp. |
| 21 | Salticidae | *Hasarius adansoni*(Adanson's Wall jumper) |
| 22 | | *Menemerus bivittatus*(Common wall jumper) |
| 23 | | *Myrmarachne sp.* |
| 24 | | *Plexippus paykulli*(Pantropical Jumping spider) |
| 25 | | *Plexippus petersi* |
| 26 | | *Hyllus semicupreus* (Heavy bodied jumper) |
| 27 | | *Telamonia dimidiata* |
| 28 | Scytodidae | *Scytodes* sp. (Spitting spider) |
| 29 | Sparassidae | *Heteropoda venatoria*(Huntsman spider) |
| 30 | Theridiidae | *Argyrodes argentatus* |
| 31 | | *Argyrodes flavescens* |
| 32 | | *Meotipa* sp. ( Spiny theridiid spider) |
| 33 | | *Chikunia sp* |
| 34 | Thomisidae | *Camaricus formosus* |
| 35 | | *Oxytate virens* |
| 36 | | *Synema revolutum* |
| 37 | | *Xysticus minutus* |
| 38 | | *Thomisus* sp. (Crab spider) |
| 39 | Theraphosidae | *Chilobrachys sp.* |
| 40 | Uloboridae | *Uloborus* sp. |

## 8. Coleoptera diversity found in Gauhati University
## Total No. of Coleoptera Species: 21

| S/ No | FAMILY | SCIENTIFIC NAME |
|---|---|---|
| 1 | Atlelabidae | *Trachdophorus giraffa* |
| 2 | Chrysomelidae | *Aulacophora sp.* |
| 3 | | *Charidotella sexpunctata* |
| 4 | | *Chrysolina coerulans* |
| 5 | | *Deloyala guttata* |
| 6 | | *Hoplasoma unicolor* |
| 7 | | *Podagrica fuscicornis* |
| 8 | | *Lilioceris lilii* |
| 9 | | *Monolepta signata* |
| 10 | | *Metriona bicolor* |
| 11 | | Unknown sp. |

| | | |
|---|---|---|
| 12 | Cantharidae | *Chauliognathus lugubris* |
| 13 | Coccinellidae | *Coccinella septempunctata* |
| 14 | | *Exochomus guadripustulatus* |
| 15 | | *Epilachna vigintioctopunctata* |
| 16 | | *Propylea gualtuordecimpunctata* |
| 17 | | *Rodolia rufopilosa* |
| 18 | Curculionidae | *Hypomeces sp* |
| 19 | | *Hypera sp* |
| 20 | Scarabaeidae | *Aphodius fasciatus* |
| 21 | | *Serica mystaca* |

**Fish Diversity of G U Campus**

1. *Oreochromis mossambicus* (exotic)
2. *Anabas testudineus*
3. *Tricogaster fasciata*
4. *Channa punctata*
5. *Channa gachua*
6. *Puntius sophore*
7. *Puntius chola*
8. *Danio rerio*
9. *Notopterus notopterus*
10. *Macrognathus aral*
11. *Clarias magur*
12. *Heteropneustes fossilis*
13. *Mystus tengra*
14. *Monopterus cuchia*
15. *Esomus dandrica*

**Annex II**

**Details of lighting arrangements in different establishments of Gauhati University**

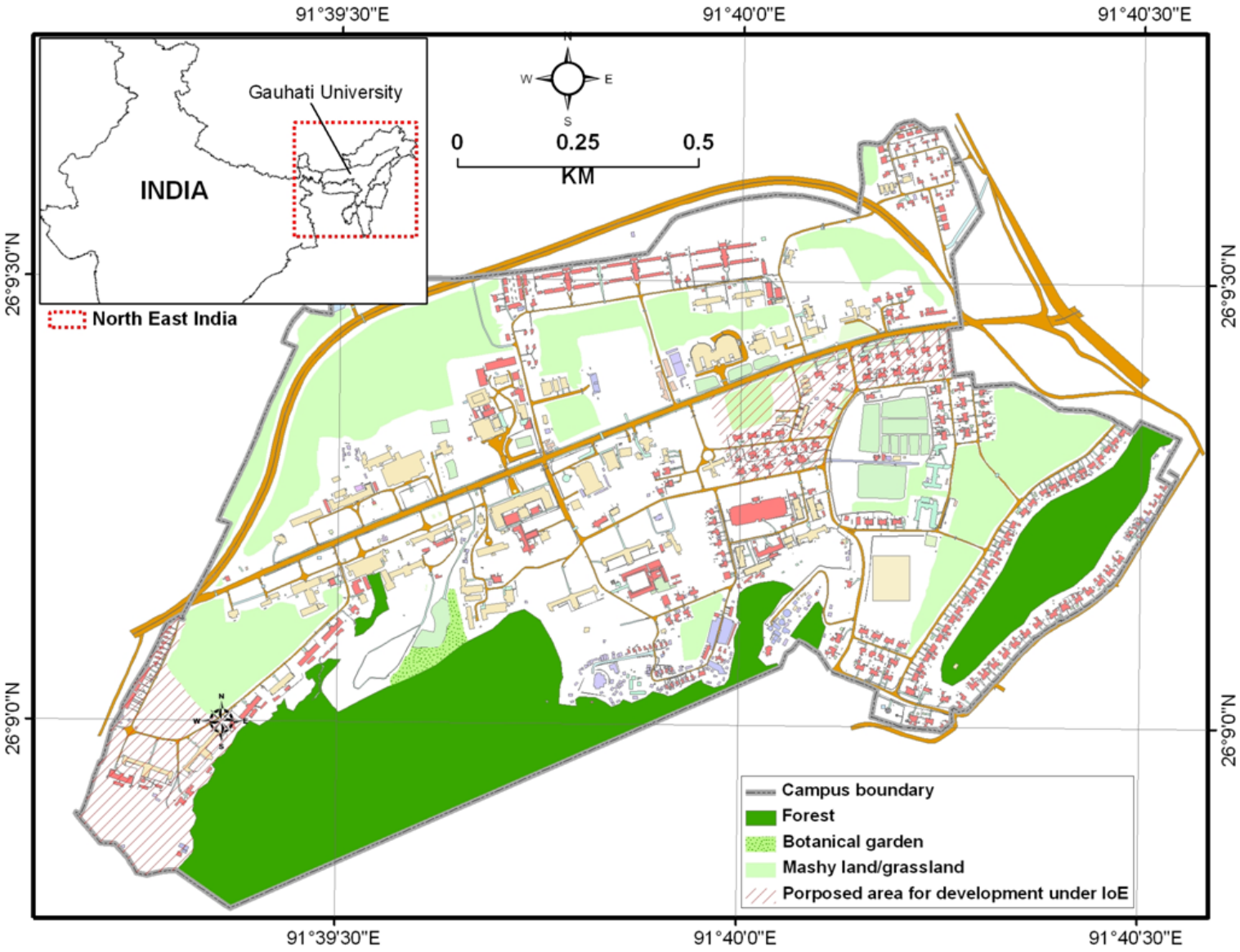
| Sl. No. | Department | No. of Fluroscent luminaries | | | | No. of LED luminaries | | | | | Total Wattage in existing Fluoroscent/ incandescence luminaries (Watt) [A] | Total Wattage in LED (Watt) [B] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Existing Fluroscent Tube (40 W) | Existing CFL Light (15W) | Existing CFL Light (20W) | Incandenscence Lamp (60W) | LED Tube (18 W) | 15W LED Down-lighter | 18W LED Down-lighter | 12W LED Down-lighter | LED bulb (10W) | | |
| 1 | Gauhati University Works Department | 18 | 7 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 825 W | 90 W |
| 2 | Administrative Building | 317 | 52 | 0 | 0 | 32 | 21 | 0 | 0 | 0 | 13,460 W | 891 W |
| 3 | Phanidhar Dutta Seminar Hall | 37 | 10 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1,630 W | 15 W |
| 4 | Gauhati University Institute of North East India Studies | 29 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,490 W | 0 W |
| 5 | Statistics Department | 119 | 35 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 5,285 W | 360 W |
| 6 | Zoology & Biotechnology Dept. | 396 | 217 | 0 | 0 | 35 | 16 | 0 | 0 | 0 | 19,095 W | 870 W |
| 7 | Bodo Dept. | 43 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1,915 W | 30 W |
| 8 | Environmental Science Dept. | 95 | 6 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 4,370 W | 0 W |
| 9 | Geological Science Dept. | 87 | 5 | 0 | 10 | 88 | 32 | 0 | 0 | 0 | 4,155 W | 2,064 W |
| 10 | Geography Dept. | 80 | 20 | 0 | 12 | 0 | 0 | 0 | 0 | 2 | 4,220 W | 20 W |
| 11 | USIC Dept. | 26 | 35 | 0 | 0 | 80 | 0 | 0 | 0 | 0 | 1,565 W | 1,440 W |
| 12 | Department of Law | 62 | 26 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 3,350 W | 0 W |
| 12 | KKH Libary Old Building | 186 | 55 | 0 | 0 | 272 | 0 | 0 | 0 | 0 | 8,265 W | 4,896 W |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 | KKH Library Annexed Building | 0 | 0 | 0 | 0 | 470 | 0 | 0 | 0 | 0 | 0 W | 8,460 W |
| 14 | Physics Department | 265 | 111 | 0 | 10 | 37 | 0 | 17 | 0 | 16 | 12,865 W | 1,132 W |
| 15 | Commerce Department | 175 | 5 | 0 | 15 | 0 | 0 | 0 | 0 | 2 | 7,975 W | 20 W |
| 16 | Chemistry Department | 300 | 130 | 0 | 10 | 5 | 0 | 0 | 0 | 12 | 14,550 W | 210 W |
| 17 | Electronics & Computer Science Department | 237 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 9,855 W | 60 W |
| 18 | Gauhati University Insitute of Science and Technology (New) | 178 | 0 | 237 | 0 | 0 | 38 | 0 | 0 | 0 | 11,860 W | 570 W |
| 19 | Journalism & Mass Comm Department | 34 | 5 | 0 | 0 | 30 | 10 | 0 | 0 | 0 | 1,435 W | 690 W |
| 21 | Arts Canteen | 5 | 19 | 0 | 0 | 20 | 27 | 0 | 0 | 17 | 485 W | 935 W |
| 20 | SLET Commision | 17 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 785 W | 0 W |
| 21 | Academic Staff College (UGC HRDC) | 95 | 14 | 0 | 0 | 16 | 16 | 0 | 0 | 1 | 4,010 W | 538 W |
| 22 | Gauhati University Insitute of Science and Technology (Old BT Hostel) | 188 | 104 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 9,140 W | 45 W |
| 23 | Botany Dept. | 210 | 30 | 0 | 35 | 0 | 0 | 0 | 0 | 8 | 10,950 W | 80 W |
| 24 | Education Department | 192 | 0 | 0 | 0 | 3 | 15 | 0 | 0 | 5 | 7,680 W | 329 W |
| 25 | Disabilities Studies Centre | 41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,640 W | 0 W |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | Psychology Department | 96 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 3,840 W | 180 W |
| 27 | Guest House (Old & New) | 21 | 39 | 0 | 11 | 0 | 40 | 101 | 0 | 125 | 2,085 W | 3,668 W |
| 28 | New Academic Building | 1979 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 79,310 W | 0 W |
| 29 | Bengali Department | 90 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3,630 W | 20 W |
| 30 | English Department | 65 | 8 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 2,960 W | 0 W |
| 31 | Arabic Department | 45 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 2,700 W | 0 W |
| 32 | Hindi Department | 75 | 5 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 3,675 W | 0 W |
| 33 | MBA Department (Old & Annexed) | 175 | 62 | 0 | 0 | 0 | 0 | 30 | 0 | 0 | 7,930 W | 540 W |
| 34 | MIL & Folklore Department | 43 | 5 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 1,795 W | 450 W |
| 35 | Security Office | 45 | 20 | 0 | 6 | 6 | 0 | 0 | 0 | 0 | 2,460 W | 108 W |
| 36 | Arts Building | 720 | 42 | 0 | 110 | 42 | 0 | 0 | 0 | 0 | 36,030 W | 756 W |
| 37 | Persian Department | 5 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 380 W | 0 W |
| 38 | Law College (Assam Type) | 50 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 2,900 W | 0 W |
| 39 | PGSU/Day Home | 60 | 8 | 0 | 15 | 0 | 0 | 0 | 0 | 2 | 3,420 W | 20 W |
| 40 | Gauhati University Publication Department | 84 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,420 W | 0 W |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 41 | Examination & Evaluation Building | 122 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4,955 W | 0 W |
| 42 | Gauhati University Press | 75 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,240 W | 0 W |
| 43 | (Zonal office) Old VC Chamber | 58 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,395 W | 0 W |
| 44 | Record Room, Cash Counter | 35 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,490 W | 0 W |
| 45 | Security Office, Meeting Branch, Registration & Affilaition & Law Officer's Chamber | 36 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,500 W | 0 W |
| 46 | Science Canteen | 15 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 825 W | 0 W |
| 47 | Faculty House | 40 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,720 W | 0 W |
| 48 | IDOL Building | 13 | 135 | 0 | 0 | 0 | 200 | 0 | 0 | 0 | 2,545 W | 3,000 W |
| 49 | BKB Auditorium | 0 | 0 | 0 | 0 | 0 | 145 | 29 | 164 | 0 | 0 W | 4,665 W |
| 50 | Pre Examination Training Centre | 24 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,080 W | 0 W |
| 51 | GU Pavilion | 13 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 715 W | 0 W |
| 52 | Directorate of Social Welfare | 19 | 7 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 985 W | 0 W |
| 53 | Gymnasium Hall | 1 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 40 W | 240 W |
| 54 | Indoor Stadium | 38 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,610 W | 0 W |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 55 | Pensioner's Office | 10 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 430 W | 0 W |
| 56 | GU Worksmen Union | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 W | 414 W |
| 57 | Food Court | 0 | 15 | 0 | 0 | 0 | 0 | 15 | 0 | 51 | 225 W | 780 W |
| 58 | GU Hospital | 90 | 2 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 5,130 W | 0 W |
| 59 | GU Hostels | 858 | 3198 | 0 | 0 | 0 | 0 | 30 | 0 | 0 | 82,290 W | 540 W |
| **Total -** | | **8432** | **4611** | **237** | **323** | **1161** | **610** | **245** | **164** | **270** | **248,090 W** | **29,487 W** |




Landuse/landcover map of Gauhati University Campus ***(Source: GU survey: 2015; Map composition**: P. Phukon)*


Google image view of  Gauhati University Campus

***Leading from the front:*** Dr. Mridul Hazarika, the Vice Chancellor, GU taking part in a plantation programme