

# **GREEN CAMPUS AUDIT, FLORAL-FAUNAL DIVERSITY**

## **Introduction**

Campus Audit aims to address the need for more comprehensive and focussed Education Training and Holistic Development of an institution. In the world of advanced researches and globalisation an audit programme of the institution provides knowledge about the detailed working of the various campus entities and the scope for betterment in areas of education and environmental action programmes. The moot areas of campus audit are- the building and infrastructure audit, human resources audit, energy audit, waste audit, hazard material (fire) audit, biodiversity audit etc. The outcome of such audit programmes give an insight into better running of the institution and judicious utilisation of its available resources, their improvement, quality enhancement and conservation and spreading the information through awareness programmes. Such practices help building holistic personality of pupils and the faculty members and is imperative towards shaping the way of “Service Learning” programme and its successful implementation.

Scottish Church College being one of the oldest Christian Minority Educational Institution in India is committed towards shaping its students and faculty members following principles of Value Education. As part of such programme the college has been receiving projects from various funding institutions including UBCHEA towards Service Learning and Environmental Action initiatives.

## **Method and methodologies followed**

The study on one hand focus in detail about the **Infrastructural facilities** available in the campus and on the other hand the water, conventional and renewable energy, fire fighting system and biodiversity audit (floral and faunal). For the infrastructure group of undergraduate students guided by faculty members did a detail study of the campus including different buildings, the total area, the hostels, the students’ uptake, ratio of teacher-student, etc.

The energy audit was done on the basis of the two year study of the electricity consumption (2017 -19) and the water resource utilisation (2018-19).

For fire audit the pockets of fire prone areas in the college including various laboratories were identified. The total fire protecting system with installations of hydrants and the pumps including a. Electric pump 60 HP (1HP = 750 W), b. Diesel pump – 72 HP and c. Jockey electric pump – 15 HP for the main campus, two steel fire exits for B.Ed. building (from the College fund) and Millennium Buildings (from RUSA fund) respectively and fire extinguishers have been installed and training programmes for the staff members were organised for fire management on 16<sup>th</sup> April, 2019 by the College authority. Various information related to college was obtained from the IQAC office, College office and Senatus office.

Campus biodiversity study programme was conducted by the postgraduate students of Botany department and undergraduate students of Zoology department. The different plants in the campus were identified and recorded. Their medicinal values were identified. Similarly the entomofauna, avifauna, mammals were studied in the campus. The identification was done following the expert guidance of faculty members and relevant literatures viz. Hooker (1872-97), Bingham (1897, 1903), Prain (1905) and Ali (2003). The photographs were taken in Semi SLR point and Shoot camera. The photographs of ants and other insects were taken using stereozoom binocular microscope.

## **The College Audit**

### **Historical Perspective**

The **Scottish Church College** is the oldest continuously running Christian liberal arts and sciences college in India. It is affiliated with University of Calcutta for degree courses for graduation and Post graduation (in Botany & Chemistry). The college aims to produce *morally upright and intellectually sound human beings* who would become better citizens of the country.

A selective co-educational institution, it is known for its academic standards, intellectual milieu, and its English Palladian architecture. Students and alumni call themselves "Caledonians" in the name of the college festival, "Caledonia".

The institutional origins are traceable to the life of Alexander Duff (1806–1878), the first overseas missionary of the Church of Scotland, to India. Known initially as the *General Assembly's Institution*, it was founded on 13 July 1830 by Alexander Duff with the assistance of Raja Rammohan Roy.

- The alumni of the college includes great names like Swami Vivekananda and Netaji Subhas Chandra Bose.
- The splendorous architecture designed by John Gray and Captain John Thompson including its magnificent prayer hall is eloquent testimony to its timeless heritage and the pioneering vision of its founding fathers.
- The College logo *NecTamenConsumeatur* (The Bush Burns but is Not Consumed) is an allusion to the experience of Moses when he ascended "the mountain of God", Mount Horeb and found himself in the presence of the Divine.
- The College has under its control, **five hostels**, viz. the Lady Jane Dundas Hostel (newly renovated from UGC Grant) and Students Residence – two Girls’ Hostel, the Duff Hostel, the Wann Hostel and the Ogilvie Hostel- three Boys’ hostels. The Main Building of the College has been declared a ‘*Heritage Building*’ [Class A] by the Statutory Body constituted by the Government of West Bengal and the Calcutta Municipal Corporation.

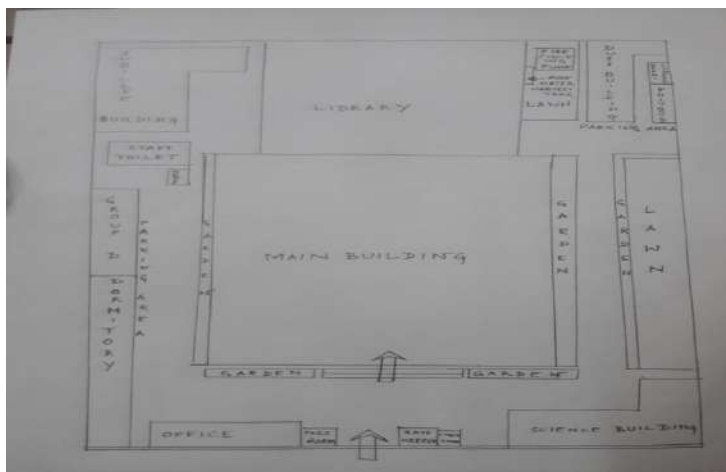
### Synoptic Information about the College

ITEM	INFORMATION
<b>Location &amp; Contact Information</b>	
Name of the Institution	Scottish Church College
Postal Address	1 and 3 Urquhart Square, Kolkata-700 006, West Bengal.
Location	Urban
Email id	<a href="mailto:principal@scottishchurch.ac.in">principal@scottishchurch.ac.in</a> ; <a href="mailto:scottish.cal@gmail.com">scottish.cal@gmail.com</a>
Website	<a href="http://www.scottishchurch.ac.in">www.scottishchurch.ac.in</a>
Land Phone	033-3350 3862
Fax	033-2350 5207
<b>Infrastructure</b>	
Built up Area	80660 sq.ft.Fig.A
Campus Area	108000 sq.ft. Fig. A
Roof area	31,000 sq. ft.
Open space	10,000 sq.ft.
Number of Boarder’s Rooms	Students’ hostels, 215 rooms

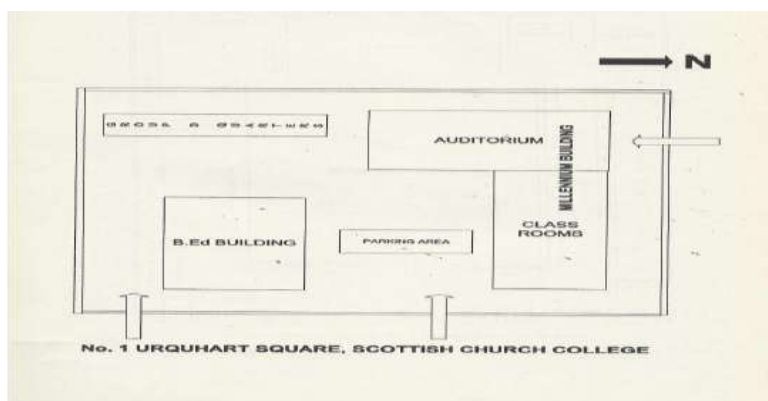
Number of Teachers' quarters	5
Number of staff quarters	20 (individual units)
Total persons residing in the campus	100 (apprx.)
Number of Auditorium	2 (air conditioned)
Students' Hostels:	3 boys; 2 girls
Inmates in boys hostels	173
Inmates in girls hostels	150
Facilities in hostels	24 hours electricity, running water, mess hall, common toilets, recreational rooms, under constant surveillance of CCTV, Elevator in the Dundas hostel, space for outdoor and indoor games.
<b>Courses &amp; Class Duration</b>	
Class duration	10am-5.30 pm (Mon to Fri) & 10am-2pm (Sat); 6.30am to 11.30 pm (BCom)
Courses provided	BA, B.Com, B.Sc., BBA, B.Ed. (girls); Masters in Botany & Chemistry (all under Calcutta University).
<b>Main Equipments used:</b>	
Lights	668 (tube lights 40W), 600 (in hostels)
LED bulbs and tubes	308(tubes @20W, bulbs @ 10 W and syska ceiling lights @ 28W)
CFL lights	116 (@ 18 W)
Fans (ceiling + standing)	451, 200 in hostels
Computers and laptops	338 (i 3 mainly) and
Projectors	27
CCTV cameras	32 in college and 37 in hostels
LCD panels as notice boards	4
Air Conditioners	30 (includes 1 ton and 1.5 ton capacity)
Pumps	4 (1 hp capacity)
Refrigerators	30 (200 lt capacity)
Campus lights	10 solar, 20 tubelights
Aquaguard water filters and coolers	27
Genset available and capacity	Diesel genset (125 kW capacity) (2)

<b>Human Resources:</b>	
Total Staff	Teaching: 97 [FTT 72, PTT 3, CWTT 22]; Non-Teaching Staff: 93 [Full time 30, On Contract: 63]
Total Student uptake	2155
Teacher: Student Ratio	1:22 (nearly)
Girl Student: Boy Student Ratio	49:51
Reservation in Student Uptake	
SC & ST (Socially backward classes) :	20: 3 : 30
PH : Christian	
Students From Outside state (%)	10

**Fig. A: Master Plan of the Main Campus and Teacher Education Building**



**GARDEN AND LAWN ON THE NORTH SIDE**



## Energy Audit

### Electricity Load Information [2 Year Average]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
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Average Daily Energy Usage (kWh)	164	266	380	410	151	299	170	413	500	284	121	245
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Months with peak load: March, April, June, July, August and September

**Average Electricity usage in the main building (June 2018 – May 2019):**

Month	Units Consumed	Bill Amount (Rs.)	Deduction for solar energy injection
June	5560	91,390	161
July	7510	42,106	-
August	8192	45,929	-
September	8168	45,795	761
October	4400	36,220	2064
November	3540	28,760	1493
December	3624	29,870	1098
January	3202	26,414	-
February	3832	31,970	614
March	5440	44,110	1303
April	7520	60,780	1405
May	7450	60,380	1054

Total amount Rs.5,43,724.00. Monthly Average Rs. 45,310.33

Total units: 68,438: Monthly average: 5703

**Electricity Conservation Initiative:**

- A. Centralized Solar Panels: Photo Voltaic Array has been installed on roof top of the main building which have been connected to the Power grid. College sells extra electricity

generated by the solar panels on holidays to CESC and earning Carbon Footprint points. The size of the solar panels are 32 x (3'3" by 6'6"). It started in October, 2017 with 10 KVA power. Maximum achievement normally is obtained (7.05 KW) in month of November with no cloud cover. Thus the college is contributing to Carbon Credit and CESC is crediting that amount of money in the form of concession in the bill as for example Rs.606 discount from the February 2019 electric bill.



**Fig B: Solar panels on roof top**

B. The collage has set up 10 solar light units in the campus and planning to set up solar panel in larger numbers to address the issue of energy conservation.



**Fig. C-**

**Solar light in Campus**

## Water Audit

**Average Water Usage:**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Average Daily water Usage (kilo lit)	20	30	30	30	15	10	30	30	30	10	30	20

### Water Conservation Initiative:

- A. **Rain water harvesting:** Scottish Church College has initiated the rainwater harvesting project to generate “concern for water” among the students at a time when water crisis is a reality. When Fire fighting mechanism was installed on campus a few months ago, the college authorities decided to connect it to a reservoir storing rain water. The 6m long, 5 m wide and 2.5 m deep reservoir can store 80,000 L of water. The rainwater is collected from the terrace of the building that houses the Botany & Zoology Departments and taken through pipes to a 6 Ft long, 4 Ft wide and 8.5 Ft deep tank before carried to the underground reservoir.
- B. **Water dripping from Air Conditioners:** The water dripping from Air Conditioners is also collected in the buckets to water plants in some of the places inside the campus.
- C. **Reuse of the effluents of the distillation plant units:** The Chemistry, Botany and Microbiology departments have set up collection unit for their distillation plant outlet. The collected water from the distillation unit is used for gardening purpose (Fig. C).



Fig. D- Distillation effluent water collection





**Fig E:Reservoir of roof water harvesting**

## Fire Safety Audit:

**Fig F: Fire fighting system in main campus**



### **1. Proper Fire fighting system in the main campus:**

**A. Electric pump 60HP (1HP=750W)-** Back pullout type Main fire pump having capacity discharge 137 cu.m/hr a head of 70m, 2900 RPM coupled with TEFC 45 KW motor with base frame.

**B. Diesel Pump – 72 HP-** Back pullout type main fire pump having capacity of discharge 137 cu.m/hr at a head of 70m, 1800 RPM coupled with BHP radiator cooled engine with base frame.

**C. Jockey electric pump -15 HP-** Back pullout type jockey pump having capacity of discharge 10.8

cu.m/hr at a head of 70 m, 2900 RPM coupled with TEFC 9.3 KW motor with base frame.

**D. 12 single headed Hydrant Valve with RRL hose.**

## 2. Different fire extinguishers installed in the college and their type

Dept.	ABC Type	ABC Type	DCP Type	DCP Type	DCP Type	CO <sub>2</sub> Type
	2 Kg	5 Kg	5 Kg	10 Kg	50 Kg	2 Kg
Chemistry (UG+PG)	3 pcs.	6 pcs.	--	6 pcs.	1 pc.	2 pcs.
Botany (UG+PG)	--	3 pcs.	2 pcs.	2 pcs.	--	1 pc.
Physics	2 pcs.	1 pc.	--	1 pc.	--	--
Zoology	2 pcs.	4 pcs.	--	--	--	--
Library	--	6 pcs.	1 pc.	--	--	--
PG office	--	--	--	1 pc.	--	--
Main Gate	--	1 pc.	--	--	--	--
Maths	1 pc.	--	--	1 pc.	--	--
B.Ed	--	1 pc.	--	2 pcs.	--	--
B.B.A	--	2 pcs.	--	--	--	--
Microbiology	2 pcs.	2 pcs.	--	1 pc.	--	--
Computer Sc.	--	1 pc.	--	2 pcs.	--	--
Main Lobby	--	4 pcs.	--	4 pcs.	--	--
Assembly Hall	--	3 pcs.	--	3 pcs.	1 pc.	--
Seminar Room	--	2 pcs.	--	2 pcs.	--	--
Office	--	2 pcs.	--	2 pcs.	1 pc.	--
M.L. Bhowmik Auditorium	--	3 pcs.	--	3 pcs.	1 pc.	--
Canteen	--	2 pcs.	--	--	--	--
Ladies Common Room	--	1 pc.	--	--	--	--
Boys Common Room	--	1 pc.	--	--	--	--
<b>Total</b>	<b>10 pcs.</b>	<b>45 pcs.</b>	<b>3 pcs.</b>	<b>30 pcs.</b>	<b>4 pcs.</b>	<b>3 pcs.</b>

### 3. Different Fire Exits :



Fig G: Fire exit for Millennium Building & B.Ed. Building

### Waste Management Audit:

#### Segregation and Management of Solid, Liquid and Electronic Wastes:

1. **Solid waste disposal:** Plant related wastes are converted to vermin-compost in the campus. 1000 kg of compost (fertilizer) is generated every 6 months from 14 pits. Rest of the solid waste is collected by the house keeping persons and disposed off in the compactors installed by the Kolkata Corporation.



Fig H:

2. **Liquid waste disposal:** Liquids from laboratories are segregated into organic and inorganic. Talks have been initiated with company (West Bengal Waste Management Limited, A division of M/s RAMKY Enviro Engineers Ltd.) which has expertise in disposal.



Fig I:

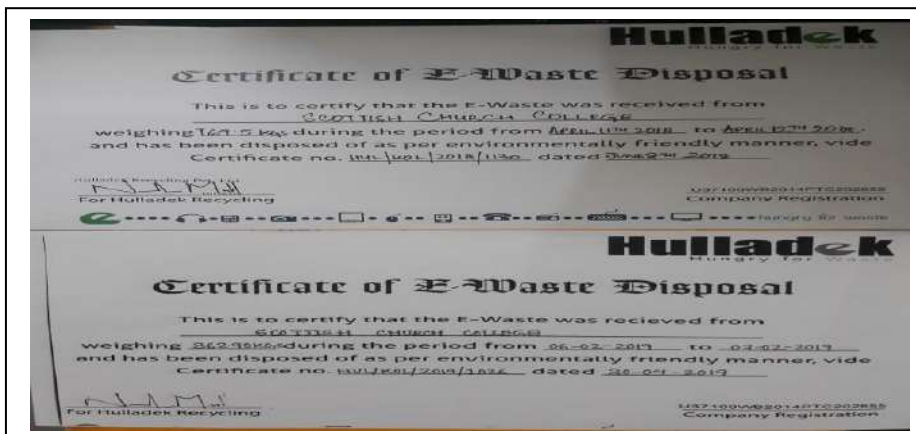
3. **E-waste disposal:** Scottish Church College has entered into an agreement with Hulladek Recycling (Registration Number- U37100WB2014PTC202655) for scientific disposal of E – waste. The company issues a certificate and pays the college at stipulated rates.

a. On 12<sup>th</sup> April, 2018, 169.5 kg of E-scrap was sold for recycling for an amount of Rs.12,585/.

Certificate was issued on 8<sup>th</sup> June, 2018.

b. On 6<sup>th</sup> February, 2019, 362.9 kg of E waste was sold for recycling for an amount of Rs.5442/

. Certificate was issued on 30<sup>th</sup> April, 2019.





## Floral and Faunal Biodiversity in the Campus

The Campus although located in the heart of the city maintains its greenery. Survey conducted by the faculty members of Botany department with the post graduate students identified about 90 plant species of various genera. Most of the recorded species have medicinal importance. Pictures of some of the floral elements are given in Fig. D. The college maintains its own nursery to cultivate various other useful medicinal plants. This floral diversity provides a conducive ambience to wide gamut of faunal elements to be present in the campus. This includes a rich diversity of insects including butterflies, ants, wasps, birds and mammals. Till date the survey recorded about 26 bird species (Fig. E), 45 insect species (Fig. F,G,H), and 4 mammalian species (Macrochiropteran bat, Cat [*Felis* sp.], *Bandicota* sp. and *Rattus* sp.).

Following sections provide photographs of the recorded floral and faunal diversity in the campus:

**Fig J- Floral diversity:**



*Atalantia monophylla*



*Abroma agusta*



*Morinda citrifolia*



*Costus speciosus*



*Pimenta racemosa*



*Coleus blumei*



*Clerodendrum indicum*





*Ocimum gratissimum*



*Hygrophila spinosa*



*Tylophora indica*



*Mimosa pudica*



*Anthurium crystallinum*



*Cinnamomum zeylanicum*



*Cymbopogon citratus*



*Alpinia galanga*



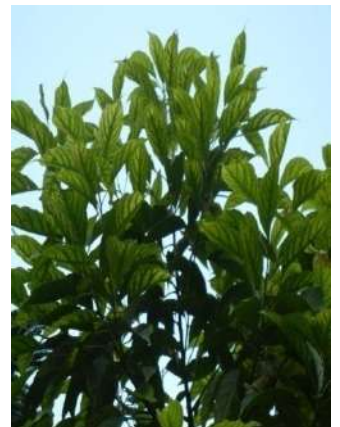
*Andrographis paniculata*



*Hemidesmus indicus*



*Aloe vera*



*Elaeocarpus nitrus*





*Calotropis procera*



*Glycosmis sp*



*Rouwolfia serpentina*



*Saraca indica*

## Faunal Diversity

### Some Common Birds Visiting the Campus [Fig. K]



*Acridotherestrictis*



*Corvus splendens*



*Spilopeliachinensis*



*Athenebrama*



*Psittaculakrameri*



*Pycnonotusjocosus*



*Halcyon smyrnensis*



*Dendrocittavagabunda*



*Pycnonotuscafer*



*Columba livia*



*Dicrurusmacrocerus*



*Orioluskundoo*



*Eudynamysscolopaceus*



*Milvusmigrans*



*Passer domesticus*

**Fig. L- Entomofauna: Order- Lepidoptera [Butterflies]**



*Tirumalalimniace*



*Ariadne merione*



*Euthaliaaconthea*





*Mycalesis perseus*



*Melanitis leda*



*Eurema hecabe*



*Papilio polytes*



*Elymnias hypermnestra*



*Delias eucharis*



*Euchryops chejus*

*Danaus chrysippus*



**Fig.M- Order: Hymenoptera [Ants, wasps]**



*Camponotus wasmani*



*Crematogaster* sp.



*Meranoplus bicolor*



*Solenopsis geminata*



*Plagiolepis longipes*



*Oecophylla smaragdina*

*Ropalidia artifex*

*Odynerus fistulosus*



*Scolia obscura*



## Awareness Programmes [Community Outreach]

Awareness programmes form part of the projects that the college has undertaken. The college has undertaken various awareness programmes and training programmes with the school students of nearby schools. In these programmes the school students and teachers are encouraged to undertake Environment Action programmes in their institutes and technical assistance is rendered by the faculty members of the college to initiate such programmes. The schools where these programmes have been undertaken are Scottish Church Collegiate School, Bethune Collegiate School and St. Margaret's School. Some pictures of the awareness programmes are given below:



**Fig. N-Environment Awareness & Biodiversity Programme in Bethune Collegiate School**



**Fig. O-Environment Awareness & Biodiversity Programmes in Scottish Church Collegiate School**



**Fig. P- Environment Awareness Programme in Scottish Church College for Students of Neighbouring Schools**

## **A certificate course on Wildlife and Biodiversity Conservation in changing climates**

**Organized jointly by Scottish Church College, West Bengal State University and SHER**

A CERTIFICATE COURSE After decades of ignorance and denials, it's time to accept that we have jeopardised our existence on the planet. We are removing forests, killing our wildlife, destroying biodiversity, polluting the air we breathe, poisoning the water we drink, climate patterns are getting unpredictable, global temperature is on the rise, pole caps and glaciers are melting, sea level is rising, surface and ground waters are fast waning, plastics are choking the ecosystems..., in fact, we have pushed the earth towards an extreme limit beyond which mankind along with millions of other species might soon go to the dinosaurs' way. For our own survival, to keep the planet habitable for our future generation we need to start acting NOW! It's indeed an emergency. There is no magic wand to stop and reverse this catastrophe, except ours will and wise actions. Sufficiently aware, effectively sensitized, motivated to act, every citizen has to contribute in the struggle for our own survival by changing our behaviors from destructive to restorative, either, by joining the battle directly as professionals or volunteering activists, or by extending the support to those who are fighting to save our forests, wildlife and biodiversity. Most importantly, we must raise our voice at every available forum to force the decision makers to adopt environment friendly policies and to act accordingly. The plight of the indigenous and marginalized communities who have been living in harmony with nature for ages and have now lost their traditional habitats and/or critically affected by the changing scenario should be taken into concern too. The certificate course - 'Wildlife and Biodiversity Conservation in Changing Climates' has been conceptualized keeping the above perspectives in focus. The course is being jointly organized by the West Bengal State University, Scottish Church College and SHER (Society for Heritage and Ecological Researches). This deep learning course is designed and meant for aspiring graduates & beyond, i.e. students, teachers, business personnel, and professionals from any field, wildlife conservation supporters and other civil society members.

The participants will be made aware and sensitized on the complex nature of the problems and challenges of conserving our natural resources like wild habitats, freshwaters, wildlife and varied biodiversities in this wake of climate crisis. They will be given orientation in the course to find out ways to join this battle for our survival, - as a professional, as a volunteer, as a communicator etc. whatever befitting. Eminent researchers, highly experienced foresters and well-known conservationists will be the honorable faculties of the course. The course lectures would cover the following aspects - !

- Climate Change scenario in the perspective of biodiversity and human lives !
- Vanishing Fresh waters: the crisis in our rivers, wetlands and ground water !
- Man-Animal conflicts and its mitigations to conserve the endangered species like tigers, leopards, elephants, crocodiles, etc. !
- Management of Wildlife Reserves: the unique challenges of Sundarbans !
- Rationale behind conserving tigers in a rapidly changing nation!
- Management of Wildlife Reserves in the Himalayan foothills and Terai plains !
- Management of ecological refugees: the elephants in south-west West Bengal !
- Developments, climate change and bird diversity !
- Living with the forests and wildlife: our traditions of conservations !

- Development VS Conservation: are natural ecosystems bedrocks of our economy? !
- The Biodiversity Act of India and the State Biodiversity Board !
- People's participations in documenting, monitoring and conserving local biodiversity !
- The Wildlife and Forest Acts of India and its implementations !
- The scenario of wildlife crimes and its prevention !
- Scopes of involvements as professionals or volunteers in saving our biodiversity, wildlife and environment !
- Role and responsibility of media in conservation of our biodiversity

**Duration of the course:** Once a week (Saturday afternoons, one Friday afternoon) for eight weeks including field classes. (An optional field study trip for 3N4D at additional cost)

**Number of Seats:** 40 (forty) **Course Fee:** INR 3500/- (Rupees three thousand five hundred only)

**Venue:** Smart classrooms of Scottish Church College, Kolkata

**Application Form:** <https://forms.gle/9iB4MPzPcwLfoiAD7>

**Last date of application:** 17th August, 2019, 18:00 hrs

Selection will be based on the conservation urge of the applicant as reflected in the SOP to be written in the application form and priority of application date and time.

**Course Director :** Prof. Silanjan Bhattacharyya, PhD (IISc) Dept. of Zoology, West Bengal State University

**Course Coordinators:** Dr. Samrat Bhattacharjee, PhD (CU) Associate Professor, Dept. of Zoology, Scottish Church College & Mr. Joydip Kundu General Secretary – SHER Member – State Board for Wildlife, West Bengal

**Organising Secretaries:** Ms. Suchandra Kundu Honorary Wildlife Warden – Kolkata Founder-Member – SHER & Dr. Madhumanjari Chaubey Nee Mandal, PhD (CU) Associate Professor, Dept. Of Botany, Scottish Church College

**Chief Advisors:** Prof. Basab Chaudhuri Hon'bl VC, West Bengal State University

Prof. (Dr.) Arpita Mukerji Principal, Scottish Church College

Prof. Narayan Ghorai, PhD (CU) Dept. of Zoology, West Bengal State University

Dr. Supratim Das Vice Principal, Scottish Church College

Dr. Indrani Kar IQAC Coordinator, Scottish Church College

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