

Course Highlights

A 30hrs ONLINE CERTIFICATE COURSE ON An Introduction to Population Dynamics

Proposed to be conducted by the

Departments of Botany, Zoology & Mathematics, Karimpur Pannadevi College

Course Meeting Times:

Duration: 10 days (28th Sep 2020 – 09th Oct 2020, excluding Saturdays, Sundays, and Holidays).

Lectures: 3 sessions / day, 1 hour / session.

Timings: 10:00 am - 11:00 am & 4:00 pm onwards

Prerequisites:

There are no formal prerequisites for this course, but we do presuppose the participants from Karimpur Pannadevi College with high school-level Biology and Mathematics as their subjects of study.

Video-conferencing platforms:

Google Meet and Cisco Webex

Resource Persons:

- Iflikar Rahaman, Department of Zoology, Karimpur Pannadevi College
- Sri Bipul Sarkar, Department of Botany, Karimpur Pannadevi College
- Dr. Joydeb Bhattacharyya, Department of Mathematics, Karimpur Pannadevi College

Modules/Topics to be addressed:

- Population Growth and Growth Models
- Competition and its evolution
- Community Ecology
- Community Dynamics
- Ecological Niche

-----By Iflikar Rahaman

- Metapopulation Dynamics
- Species Interactions
- Ecosystem Dynamics
- Biodiversity Parameters
- Biodiversity Regulations

----- By Bipul Sarkar

- Quantification of growth
- Knowledge of growth curve models
- Extended family of growth curve models
- Model selection diagnostics
- Mathematical models

----- By Dr. Joydeb Bhattacharyya

Registration is Absolutely FREE.

All the participants are requested to register online by browsing a link provided at the flyer and at the formal notice.

Registration is mandatory for all the participants.

Assignments:

There will be 15 problem sets of the course corresponding to the total 15 modules/topics. Completed problem sets must be submitted online by the due date/time. Problem sets will not be accepted late and will be scored **zero** points if not submitted on time.

E-Certificates will be mailed to the registered participants by 15th Oct 2020.

Official Communications

10/15/2020

Gmail - Application for the permission to conduct an Online Certificate course



Joydeb Bhattacharyya <b.joydeb@gmail.com>

Application for the permission to conduct an Online Certificate course

5 messages

Joydeb Bhattacharyya <b.joydeb@gmail.com>

Thu, Sep 10, 2020 at 9:01 PM

To: KAUSTAV BHATTACHARYYA <kaustabhata@rediffmail.com>, Karimpur Pannadevi College <pannadevicollege@gmail.com>

Cc: Prasenjit Saha <prasenjit.pnm@gmail.com>, Bipul Sarkar <bipulsarkar007@gmail.com>, Ripan Ripan <rahamaniftikar@gmail.com>, Joydeb Bhattacharyya <b.joydeb@gmail.com>

Dear Sir,

This is for your kind information that the Departments of Mathematics, Botany and Zoology are willing to conduct an online certificate course on "An Introduction to Population Dynamics" on and from 28th Sep 2020 to 09th Oct 2020, barring Saturdays, Sundays and Holidays. The online certificate course will involve a total of 30 hours of interactive teaching using Google Meet and Cisco Webex video conferencing platforms. The proposed certificate course will be free from any charges and intended for the interested participants of Karimpur Pannadevi College with a preferably pre-requisite study in Biology and Mathematics at the high school level. Only the first 100 registered "Early Birds" will be allowed to participate in the programme.

I request you to permit our departments to conduct the aforementioned online certificate course.

Your active cooperation in this regard is highly appreciated.

Waiting for your reply.

Yours sincerely,

Joydeb

A pdf highlighting the modules/topics of the proposed programme is hereby attached.

Joydeb Bhattacharyya, PhD | SERB-TARE Fellow
Assistant Professor | Department of Mathematics, Karimpur Pannadevi College
Nadia, West Bengal-741152, INDIA
Phone: +91 9007230059 | b.joydeb@gmail.com
<https://tinyurl.com/w5qgg3c>
<https://sites.google.com/view/joydebb/home>

Highlights.pdf
164K

<https://mail.google.com/mail/u/0/?ik=24294c7e6c0&view=pt&search=all&permmsgid=thread-a%3A4000010974203433562&dsqt=1&siml=msg-a%3A4007963461715085016&siml=msg-a%3A-62110704418663723&siml=msg-f%3A1677814340520075800&siml=msg-a%3A-2608246204813641607&siml=msg-...> 1/6

10/15/2020

Gmail - Reply



Joydeb Bhattacharyya <b.joydeb@gmail.com>

Reply

Prasenjit Saha <prasenjit.pnm@gmail.com>

Fri, Sep 11, 2020 at 5:05 PM

To: Joydeb Bhattacharyya <b.joydeb@gmail.com>

IQAC of Karimpur pannadevi College would like to take the opportunity to convey it's sincere tanks to you for taking this very useful academic endeavour. IQAC has always appreciated this kind of quality initiative. The cell formally provide it's green signal for proceeding further to conduct the online certificate course and also hope to get the final clearance from the head of the institution.

The cell is happy to announce its support (as necessary) for smooth completion of the course.
With regards.

On Fri, 11 Sep, 2020, 12:31 PM Joydeb Bhattacharyya, <b.joydeb@gmail.com> wrote:
Once getting an official clearance, we can discuss further.

On Thu, 10 Sep, 2020, 9:50 pm Prasenjit Saha, <prasenjit.pnm@gmail.com> wrote:
Thanks for your mail. Very progressive and collective initiative. Is there any necessity to have a course coordinator sir? I am not sure. But just a query.
With regards.

10/15/2020

Gmail - Application for the permission to conduct an Online Certificate course



Joydeb Bhattacharyya <b.joydeb@gmail.com>

Application for the permission to conduct an Online Certificate course

KAUSTAV BHATTACHARYYA <kaustabhata@rediffmail.com>

Mon, Sep 14, 2020 at 6:30 PM

To: Joydeb Bhattacharyya <b.joydeb@gmail.com>

Please go ahead Sir. Best wishes.
[Quoted text hidden]

Online Certificate Course on An Introduction to Population Dynamics

28th Sep—09th Oct 2020*

(*barring 02nd & 04th Oct)

Jointly conducted by the Departments of
Mathematics, Botany & Zoology
Karimpur Pannadevi College



Course Completion Report Oct 2020

Report jointly prepared by:

Dr. Joydeb Bhattacharyya
Assistant Professor
Department of Mathematics
Karimpur Pannadevi College

Sri Bipul Sarkar
Assistant Professor
Department of Botany
Karimpur Pannadevi College

Iftikar Rahaman
Assistant Professor
Department of Zoology
Karimpur Pannadevi College

Flyer of the certificate course

Course Modules

- Population Growth and Growth Models
- Competition and its evolution
- Community Ecology
- Community Dynamics
- Ecological Niche
- By Ifikar Rahaman
- Metapopulation Dynamics
- Species Interactions
- Ecosystem Dynamics
- Biodiversity Parameters
- Biodiversity Regulations
- By Bipul Sarkar
- Quantification of growth
- Knowledge of growth curve models
- Extended family of growth curve models
- Model selection diagnostics
- Mathematical models
- By Dr. Joydeb Bhattacharyya

The interactive course will be offered through online mode on Google Meet & Cisco Webex platforms.

The mode of assessment will be based on MCQ based test on each module.

Certificate of completion will be awarded to all the participants upon successful completion of the course.

***28th Sep - 09th Oct 2020**
**Excluding Saturdays, Sundays and other holidays*

An ONLINE CERTIFICATE COURSE on


An Introduction to Population Dynamics

MATH BIO

Jointly organised by
**The Departments of
 Mathematics, Botany & Zoology
 Karimpur Pannadevi College**

Course duration: 30hrs
 Students pursuing B.Sc. from Karimpur Pannadevi College are only eligible to apply

Register for FREE!




<https://tinyurl.com/vyltedug>

Registration on Windows:
18th - 26th Sep 2020

Conveners:

Dr. Joydeb Bhattacharyya	Asst Profs	Department of Mathematics
Sri Bipul Sarkar		Department of Botany
Ifikar Rahman		Department of Zoology



Introduction

About the Report

This report summarizes the output of the 10-day (30 hours duration) online classes on 'An Introduction to Population Dynamics' conducted jointly by the Departments of Mathematics, Botany and Zoology, Karimpur Pannadevi College from 28th Sep to 09th Oct 2020, barring 02nd and 04th Oct 2020.

The report aims to fulfil the following purposes:

- (i) Record all the process and tools used in the classes and new experiences gained during the training.
- (ii) Collect and analyze suggestions and recommendation from the participants so that the training course can be improved in future.
- (iii) Access the effectiveness of the course based on the reaction and evaluations of the participants.

Background and Rationale

Population dynamics is a branch of science which is concerned with the short and long-term changes in the size and age composition of populations, and the biological and environmental processes influencing those changes. It deals with the way populations are affected by birth and death rates, and by immigration and emigration, and studies topics such as ageing populations or population decline.

The online certificate course on An Introduction to Population Dynamics was the first of this kind conducted jointly by the Departments of Mathematics, Botany and Zoology, Karimpur Pannadevi College. The course covered the fundamentals of Population Dynamics and was designed to help the students of in enhancing knowledge on theoretical foundations of population ecology together with developing mathematical models as tools to understand the

changes in population growth. The course also covered some important applications on population ecology to solve real-world problems. The online course emphasized on lectures and tutorials apart from daily quiz sessions.

The interactive course was offered through online mode on Google Meet & Cisco Webex platforms. The mode of assessment was based on MCQ based test on each module. Certificate of completion was awarded to the registered participants upon successful completion of the course. The online registration window was open from 16th – 26th Sep 2020.

Objective

The objectives of the course are

- (i) To gain knowledge on population and community ecology.
- (ii) To develop the fundamental knowledge on patterns of population distribution.
- (iii) To develop the knowledge on population growth, species relationship and behaviours.
- (iv) To learn how species behaviour are influenced by the environment.
- (v) To show how mathematics and ecology are connected.
- (vi) To enable students developing and analyzing mathematical models on ecosystems.
- (vii) To interpret results of mathematical modelling.

Outputs

By the end of the online certificate course, participating students will be able to:

- (i) Explain how and why one uses mathematical models in ecology.
- (ii) Construct population models, identify equilibria, assess their stability.
- (iii) Know the properties and applications of different population growth functions.
- (iv) Construct basic models of species interactions.

To achieve the above objectives and outputs, the following contents were discussed and practiced during the course period:

Course Outline:

Day	Modules	Hours
1-2	● Population Growth and Growth Models	2
	● Ecosystem Dynamics	2
	● Quantification of growth	2
3-4	● Competition and its evolution	2
	● Species Interactions	2
	● Knowledge of growth curve models	2
5-6	● Community Ecology	2
	● Metapopulation Dynamics	2
	● Extended family of growth curve models	2
7-8	● Community Dynamics	2
	● Biodiversity Regulations	2
	● Model selection diagnostics	2
9-10	● Ecological Niche	2
	● Biodiversity Parameters	2
	● Mathematical models	2

Participants and Facilitators

Altogether 39 students of B.Sc. (Honours & General) of Karimpur Pannadevi College registered for the course. A Telegram Channel is used to convey all the important messages to the registered participants.

The training program was facilitated by Dr. Joydeb Bhattacharyya, Assistant Professor, Department of Mathematics, Sri Bipul Sarkar, Assistant Professor, Department of Botany, and Iftikar Rahaman, Assistant Professor, Department of Zoology, Karimpur Pannadevi College.

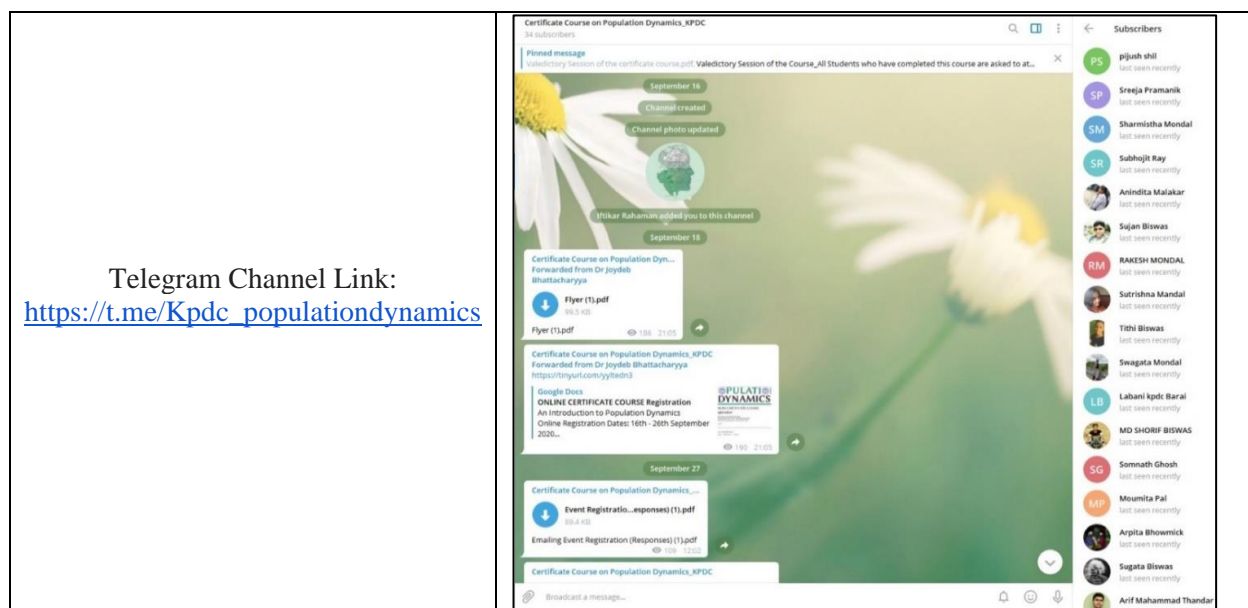
Sri Kaustav Bhattacharyya, Teacher-in-charge of Karimpur Pannadevi College and Dr. Prasenjit Saha, IQAC Coordinator of Karimpur Pannadevi College keenly observed the whole course and gave feedback and inputs to make the course more effective.

List of Registered Candidates

**CERTIFICATE COURSE IN
GROWTH CURVES IN POPULATION DYNAMICS
Departments of Botany, Zoology & Mathematics, Karimpur Pannadevi College
(28th Sep - 09th Oct 2020)**

LIST OF REGISTERED CANDIDATES

Sl. No.	Reg. Date & Time	Name of the Applicant	Student ID	Stream of Study	Semester	Email Address
1	9-16-2020 14:52:55	Dona Sarkar	19430004	BSc General (Bio Science)	3rd Semester	donasarkar2002@gmail.com
2	9-16-2020 15:02:09	Rahul Debnath	18430013	BSc General (Bio Science)	5th Semester	rockyvai21092000@gmail.com
3	9-16-2020 15:09:45	Utsa Biswas	18430023	BSc General (Bio Science)	5th Semester	utsabiswas599@gmail.com
4	9-16-2020 15:17:16	Arpita Bhowmick	18430003	BSc General (Bio Science)	5th Semester	arpita202001@gmail.com
5	9-16-2020 15:18:45	Mrinmayee Biswas	19430008	BSc General (Bio Science)	3rd Semester	mrinmayeebiswas330@gmail.com
6	9-16-2020 15:21:42	Sumana Sarmin	18430022	BSc General (Bio Science)	5th Semester	sarminsumana031@gmail.com
7	9-16-2020 15:25:14	Pramita Chakraborty	18430010	BSc General (Bio Science)	5th Semester	pramitadaisy@gmail.com
8	9-16-2020 17:20:32	Mehedi Hasan Malithya	19430007	BSc General (Bio Science)	3rd Semester	mehedihasanmalithya387@gmail.com
9	9-16-2020 19:06:01	Sreeja Pramanik	18430017	BSc General (Bio Science)	5th Semester	sreejapramanik18@gmail.com
10	9-18-2020 9:01:43	Sharmistha Mondal	19430014	BSc General (Bio Science)	3rd Semester	sharmisthamondal0003@gmail.com
11	9-23-2020 9:38:21	Anindita Malakar	18430002	BSc General (Bio Science)	5th Semester	aninditamalakara2001@gmail.com
12	9-26-2020 18:30:45	Md Shorif Biswas	20430010	BSc General (Bio Science)	1st Semester	biswasshorif786@gmail.com
13	9-26-2020 19:06:01	Somnath Ghosh	20430018	BSc General (Bio Science)	1st Semester	sg6657202@gmail.com
14	9-26-2020 19:48:49	Subhojit Ray	20430020	BSc General (Bio Science)	1st Semester	subhojitray18@gmail.com
15	9-16-2020 15:13:48	Anirban Sarkar	18210001	BSc Honours in Chemistry	5th Semester	anirbansarkar9977@gmail.com
16	9-19-2020 8:34:49	Pijush shil	18210007	BSc Honours in Chemistry	5th Semester	pijushshil349@gmail.com
17	9-16-2020 11:29:42	Susmita Biswas	18220030	BSc Honours in Mathematics	5th Semester	susmitabiswas23591@gmail.com
18	9-16-2020 11:48:24	Md Mubeen Ghaffari Mandal	18220014	BSc Honours in Mathematics	5th Semester	mubeenghaffari@gmail.com
19	9-16-2020 13:07:44	Subrata pal	19220032	BSc Honours in Mathematics	3rd Semester	subratapal065@gmail.com
20	9-16-2020 13:35:10	Tapan Mistri	19220041	BSc Honours in Mathematics	3rd Semester	smj8@datamail.in
21	9-16-2020 14:16:36	Sugata Biswas.	19220033	BSc Honours in Mathematics	3rd Semester	sugataab66@gmail.com
22	9-16-2020 14:19:53	Subhajit Saha	18220028	BSc Honours in Mathematics	5th Semester	subhajit2001saha@gmail.com
23	9-16-2020 14:32:27	Laboni Karmakar	18220013	BSc Honours in Mathematics	5th Semester	labonikarmakar2000sss@gmail.com
24	9-16-2020 17:07:38	Antu Mondal	18220002	BSc Honours in Mathematics	5th Semester	antumondal550@gmail.com
25	9-16-2020 19:27:31	Sakil Shaikh	19220022	BSc Honours in Mathematics	3rd Semester	shaikhsakil450@gmail.com
26	9-16-2020 20:37:38	RAKESH MONDAL	18220020	BSc Honours in Mathematics	5th Semester	amirakesh2009@gmail.com
27	9-17-2020 10:44:09	Kuheli Biswas	19220011	BSc Honours in Mathematics	3rd Semester	rumibiswas486@gmail.com
28	9-18-2020 17:33:31	Arif Mahammad Thandar	18220004	BSc Honours in Mathematics	5th Semester	arifthandar77@gmail.com
29	9-19-2020 7:25:47	Swagata Mondal	18220032	BSc Honours in Mathematics	5th Semester	Swagata057@gmail.com
30	9-19-2020 10:43:21	Sutrisna Mandal	18220031	BSc Honours in Mathematics	5th Semester	sutrishnamandal307@gmail.com
31	9-19-2020 10:52:14	Swastice Roy	20220026	BSc Honours in Mathematics	1st Semester	nanditagoswamiroy@gmail.com
32	9-21-2020 7:40:28	Tithi Biswas	18220032	BSc Honours in Mathematics	5th Semester	biswasstithi227@gmail.com
33	9-21-2020 7:42:12	Labani Barai	18220012	BSc Honours in Mathematics	5th Semester	labani2000b@gmail.com
34	9-21-2020 13:17:39	BISWAJIT GHOSH	20220005	BSc Honours in Mathematics	1st Semester	mrabiswajit14nov@gmail.com
35	9-22-2020 11:52:29	Moumita Pal	18220015	BSc Honours in Mathematics	5th Semester	mitamou3949@gmail.com
36	9-23-2020 6:53:06	Sujan Biswas	19220033	BSc Honours in Mathematics	3rd Semester	sujanbiswas10122001@gmail.com
37	9-23-2020 19:10:20	Ripan Pal	18220021	BSc Honours in Mathematics	5th Semester	ripanpal1234@gmail.com
38	9-19-2020 9:42:43	Soumik ghosh	20230020	BSc Honours in Physics	1st Semester	soumikghoshsoumikghosh6@gmail.com
39	9-25-2020 10:23:17	Soma sarkar		BSc Honours in Physics	1st Semester	sarkarsoma236@gmail.com



Telegram Channel Link:
https://t.me/Kpdc_populationdynamics

DAILY SCHEDULE OF THE COURSE PROGRAMME

DATE	09:00 – 10:00	10:00 – 11:00	16:00 – 17:00	17:00 – 18:00
28.09.2020	-	Population Growth and Growth Models-I (IR)	Ecosystem Dynamics (BS)	Quantification of growth (JB)
29.09.2020	Quantification of growth + Quiz (JB)	Population Growth and Growth Models-I (IR)	Ecosystem Dynamics + Quiz (BS)	-
30.09.2020	-	Competition and its Evolution-I (IR)	Species Interaction (BS)	Knowledge of growth curve models (JB)
01.10.2020	Knowledge of growth curve models + Quiz (JB)	Competition and its Evolution-II (IR)	Species Interaction + Quiz (BS)	-
02.10.2020	NATIONAL HOLIDAY			
03.10.2020	-	Community Ecology-I (IR)	Metapopulation Dynamics (BS)	-
04.10.2020	SUNDAY			
05.10.2020	Extended family of growth curve models (JB)	Community Ecology-II (IR)	Metapopulation Dynamics + Quiz (BS)	Extended family of growth curve models + Quiz (JB)
06.10.2020		Community Dynamics-I (IR)	Biodiversity Parameters (BS)	Model selection diagnostics (JB)
07.10.2020	Model selection diagnostics + Quiz (JB)	Community Dynamics-II (IR)	Biodiversity Parameters + Quiz (BS)	-
08.10.2020	-	Ecological Niche-I (IR)	Biodiversity Regulation (BS)	Mathematical models (JB)
09.10.2020	Mathematical models + Quiz (JB)	Ecological Niche-II (IR)	Biodiversity Regulation + Quiz (BS)	-
10.10.2020	Valedictory Session (JB, BS, IR)			
Abbreviation	Full Name			
JB	Dr. Joydeb Bhattacharyya			
BS	Sri Bipul Sarkar			
IR	Ifikar Rahaman			

Session proceedings

DAY ONE (28.09.2020)

The part of the report summarizes the opening of the course, session proceedings covering learning points, contents, process and outputs of each session.

Day 1 - Session 1

10:00-11:00

Facilitator: Iftikar Rahaman

Module: Population Growth and Growth Models- I

This discussions in this session was based on-

- Characteristics of Population
- Population Growth and Density

Outputs

- Discussion on Natality, Mortality, Survivorship, Survivorship Curves
- Measurements of Population Density.

Attendance

Attendance for: Class 1_Certificate Course on 2020-09-28_IR									
Names									
2020-09-28 9:59Arrival time									
Active Engagement time is written in the (first bracket) The DURATION a participant was ACTIVE									
tithi biswas	9:59 (6min)	[10:05]	10:06 (7min)	[10:13]					
rocky debnath	9:59 (33min)	[10:33]	10:33 (40min)	[11:14]					
mrinmayee biswas	10:00 (74min)	[11:15]							
ripan pal	10:00 (13min)	[10:13]							
subhojit ray	10:00 (19min)	[10:47]	10:49 (0min)	[10:49]	11:00 (1min)	[11:01]	11:08 (5min)	[11:15]	
utsa biswas	10:01 (7min)	[10:15]	10:16 (57min)	[11:14]					
dona sarkar	10:01 (20min)	[10:21]	10:22 (3min)	[10:25]	10:25 (47min)	[11:14]			
anirban sarkar	10:01 (72min)	[11:14]							
pramita chakraborty	10:04 (52min)	[10:58]	10:58 (16min)	[11:14]					
sugata biswas	10:04 (13min)	[11:15]							
sakil shaikh	10:04 (4min)	[10:08]	10:35 (18min)	[11:08]					
tapan mistri	10:05 (2min)	[10:08]							
sujan biswas	10:05 (2min)	[10:08]							
laboni karmakar	10:08 (18min)	[10:26]	10:26 (2min)	[10:28]	10:29 (31min)	[11:00]			
md.shorif biswas	10:15 (1min)	[10:16]	10:16 (10min)	[10:26]	10:26 (50min)	[11:15]			
swagata mondal	10:23 (2min)	[10:42]	10:52 (0min)	[10:52]					
sutrishna mandal	10:29 (1min)	[10:30]	10:32 (1min)	[10:42]					
susmita biswas	10:29 (4min)	[11:15]							
SOMNATH GHOSH	11:12 (3min)	[11:15]							

Total present: 19

Day 1 - Session 2

16:00-17:00

Facilitator: Sri Bipul Sarkar

Module: Ecosystem Dynamics-I

This session of the first day covered the following topics:

- What is Ecosystem?
- Level of organization of ecosystem
- Ecosystem components
- Ecosystem productivity
- Food chains and food webs

Outputs

- Knowledge gathered about ecosystem and their components, level of organization etc.
- Details of food chain and food web are discussed.

Attendance

Daily Attendance Report for Class List: 2020-09-28

[Show Attendance Summary](#)

Class: Class List Meet ID: avn-flgc-fve Date: 2020-09-28 Earliest Arrival(s): 15:50 Start Time: 15:50 End Time: 17:04 Length of Meet: 74 min

23 Names (0 Absent) ★	Arr	min	Last	15:45	15:50	15:55	16:00	16:05	16:10	16:15	16:20	16:25	16:30	16:35	16:40	16:45	16:50	16:55	17:00	17:04
✓ Labani Barai	15:50	74	17:03																	
✓ Sutrishna Mandal	15:50	7	16:12																	
✓ Laboni Karmakar	15:55	6	16:27																	
✓ Susmita Biswas	15:55	7	16:01																	
✓ Sugata Biswas	15:57	14	17:03																	
✓ Moumita Pal	15:58	8	16:05																	
✓ Rahul Debnath	15:58	8	16:05																	
✓ Subhojit Ray	15:59	65	17:03																	
✓ Dona Sarkar	15:59	16	16:14																	
✓ Swagata Mondal	16:00	5	16:47																	
✓ Pramita Chakraborty	16:01	7	17:03																	
✓ Mrinmayee Biswas	16:01	7	16:11																	
✓ Anirban Sarkar	16:01	61	17:01																	
✓ Anindita Malakar	16:01	60	17:03																	
✓ Sumana Sarmin	16:01	1	16:01																	
✓ Rakesh Mondal	16:01	4	16:04																	
✓ Ripan Pal	16:02	62	17:03																	
✓ Somnath Ghosh	16:04	58	17:03																	
✓ Utsa Biswas	16:05	56	17:01																	
✓ Kuheli Biswas	16:08	17	16:39																	
✓ Md. Shorif Biswas	16:09	7	16:28																	
✓ Sharmistha Mondal	16:15	9	16:27																	
✓ Arpita Bhowmick	16:40	24	17:03																	

Daily Attendance Legend:—

The student was present then exited rejoined and rejoined again etc. etc. (the alternating background patterns indicate that the student may have left and rejoined the Meet)
The student missed the entire class

Total Present: 23

Day 1 - Session 3

17:00-18:00

Facilitator: Dr Joydeb Bhattacharyya

Module: Quantification of Growth-I

The discussions in this session are based on:

- Definitions of Population Ecology, Community Ecology, Habitat Ecology, Genecology, Systems Ecology with appropriate examples.
- Hierarchy in Population Ecology
- Growth of an organism-per-capita growth
- Growth of a population
- Relative Growth Rate (RGR)
- Absolute Growth Rate (AGR)

Outputs

- (i) Expressions for per-capita growth and growth of a population are discussed.
- (ii) Expressions of RGR and AGR for discrete and continuous time scale are obtained.

Attendance

Attendance for: Population Dynamics2020 on 2020-09-28

Names 2020-09-28 16:50 Arrival time

rahul debnath 16:56 (56min) [17:52] 17:54 (1min) [17:55] 17:56 (7min) [18:03]

laboni karmakar 16:59 (12min) [17:11] 17:11 (52min) [18:03]

anirban sarkar 17:02 (23min) [17:25] 17:25 (9min) [17:34] 17:35 (29min) [18:03]

susmita biswas 17:02 (8min) [17:10]

moumita pal 17:03 (60min) [18:03]

kuheli biswas 17:04 (59min) [18:03]

mrinmayee biswas 17:04 (42min) [17:46]

sugata biswas 17:04 (27min) [18:03]

sumana sarmin 17:04 (11min) [18:03]

ripan pal 17:05 (58min) [18:03]

dona sarkar 17:05 (58min) [18:03]

pramita chakraborty 17:05 (58min) [18:03]

swagata mondal 17:05 (4min) [17:10] 17:57 (0min) [17:57]

anindita malakar 17:06 (46min) [17:52] 17:52 (8min) [18:00] 18:01 (2min) [18:03]

subhojit ray 17:06 (56min) [18:03]

arpita bhowmick 17:06 (27min) [17:33] 17:33 (0min) [17:33] 17:34 (1min) [17:34] 17:34 (1min) [17:35] 17:36 (17min) [17:53]

labani barai 17:06 (23min) [17:29] 17:30 (33min) [18:03]

md.shorif biswas 17:07 (16min) [17:23] 17:24 (5min) [17:29] 17:30 (1min) [17:31] 17:48 (15min) [18:03]

utsa biswas 17:08 (0min) [17:08]

rakesh mondal 17:15 (48min) [18:03]

SOMNATH GHOSH 17:29 (34min) [18:03]

Total Present: 21

DAY TWO (29.09.2020)**Day 2 - Session 1****09:00-10:00****Facilitator: Dr Joydeb Bhattacharyya****Module: Quantification of Growth-II**

Before entering the day's topic, a quick review of the previous day's discussion was carried out. The first session of the second day covered the following topics:

- Recapitulation of RGR and AGR
- Continuous Exponential growth rate
- Discrete Exponential growth rate
- Difference between discrete and continuous models with examples
- Problem solving on finding RGR, AGR for discrete and continuous models.
- Quiz session

Outputs

- Finding RGR and AGR for exponential growth model (discrete and continuous)
- Quiz

Attendance

Attendance for: Population Dynamics2020 on 2020-09-29

Names 2020-09-29 8:44 Arrival time

rahul debnath ✓ 8:45 (14min) [8:58] 9:01 (48min) [9:52] 9:53 (5min) [9:58]

laboni karmakar ✓ 8:44 (67min) [9:55]

anirban sarkar ✓ 8:48 (64min) [9:58]

susmita biswas ✓ 8:45 (12min) [9:53]

moumita pal ✓ 8:45 (65min) [9:53]

kuheli biswas ✓ 8:49 (10min) [8:58] 8:59 (12min) [9:10] 9:11 (6min) [9:16] 9:17 (4min) [9:20] 9:21 (27min) [9:53]

mrinmayee biswas ✓ 8:48 (65min) [9:58]

sugata biswas ✓ 8:45 (25min) [9:45] 9:50 (6min) [9:58]

sumana sarmin ✓ 8:48 (8min) [9:00] 9:50 (0min) [9:50] 9:58 (0min) [9:58]

ripan pal ✓ 8:45 (67min) [9:55]

dona sarkar ✓ 8:48 (14min) [9:01] 9:02 (19min) [9:20] 9:21 (10min) [9:30] 9:31 (15min) [9:45] 9:54 (0min) [9:54] 9:55 (0min) [9:55] 9:58 (1min) [9:58]

pramita chakraborty ✓ 8:45 (68min) [9:56]

swagata mondal ✓ 8:45 (12min) [9:58]

anindita malakar ✓ 8:53 (57min) [9:57]

subhojit ray ✓ 9:10 (22min) [9:35] 9:36 (11min) [9:50]

arpita bhowmick

labani barai ✓ 8:45 (70min) [9:58]

md.shorif biswas ✓ 8:46 (53min) [9:38]

utsa biswas ✓ 9:50 (3min) [9:53]

rakesh mondal ✓ 8:54 (34min) [9:27]

sornath ghosh ✓ 9:03 (47min) [9:53] 9:58 (1min) [9:58]

tapan mistri 8:44 (6min) [9:53] 9:56 (3min) [9:58]

sutrishna mandal 8:46 (7min) [8:52] 9:50 (6min) [9:56]

sharmistha mondal 8:53 (18min) [9:10] 9:25 (18min) [9:42] 9:44 (6min) [9:53]

sujan biswas 9:42 (1min) [9:43] 9:50 (0min) [9:50] 9:50 (5min) [9:54]

Total Present: 24

Day 2 - Session 2

10:00-11:00

Facilitator: Iftikar Rahaman

Module: Population Growth and Growth Models- II

Before starting the session, a quick review of the previous day's discussion was carried out. This session of the second day covered the following topics:

- Population Growth Models
- Population Growth Curves

Outputs

- Exponential Growth Model and Logistic Growth Model of Population.
- Growth rate and Comparison.

Attendance

Attendance for: Class 2 on 2020-09-29									
Names2020-09-29 10:04Arrival time									
anirban sarkar	10:04	(37min)	[11:11]						
mrinmayee biswas	10:07	(8min)	[10:18]						
swagata mondal	10:05	(0min)	[10:05]	10:07	(5min)	[10:14]			
sumana sarmin	10:05	(0min)	[10:05]	10:06	(8min)	[10:18]			
susmita biswas	10:06	(9min)	[10:14]						
anindita malakar	10:07	(26min)	[10:33]						
arpita bhowmick	10:09	(33min)	[11:11]						
dona sarkar	10:04	(36min)	[11:11]						
kuheli biswas	10:05	(7min)	[10:12]	10:17	(25min)	[11:11]			
labani barai	10:05	(31min)	[10:56]	11:04	(8min)	[11:11]			
moumita pal	10:06	(23min)	[11:11]						
laboni karmakar	10:05	(0min)	[10:05]	10:08	(3min)	[10:10]	10:11	(9min)	[10:20]
utsa biswas	10:08	(0min)	[10:08]	10:13	(2min)	[10:14]	10:54	(0min)	[10:54]
pramita chakraborty	10:05	(6min)	[10:18]	10:55	(0min)	[10:55]			
rahul debnath	10:05	(2min)	[10:18]						
sakil shaikh	10:04	(1min)	[10:06]	10:18	(1min)	[10:18]			
somnath ghosh	10:08	(1min)	[10:08]	10:18	(1min)	[10:18]	11:13	(0min)	[11:13]
sugata biswas	10:05	(6min)	[10:10]	10:18	(1min)	[10:18]	10:24	(0min)	[10:24]
sutrishna mandal	10:04	(1min)	[10:05]	10:04	(0min)	[10:04]	10:05	(0min)	[10:05]
md.shorif biswas	10:18	(20min)	[11:11]						
sharmistha mondal	10:20	(0min)	[10:20]						
subhojit ray	10:26	(0min)	[10:26]	11:06	(0min)	[11:06]			

Total Present: 23

Day 2 – Session3

16:00-17:00

Facilitator: Sri Bipul Sarkar

Module: Ecosystem Dynamics-II

A quick review of the previous day's discussion was carried out. This session of the second day covered the following topics:

- Ecological pyramid
- Energy transfer efficiencies
- Nutrient cycles
- Ecosystem services
- Types of ecosyste

Outputs

- Thoroughly discussed about different types of ecological pyramids, energy transfer efficiencies and nutrient cycles.
- Found some important ecosystem services which we always overlooked and also discussed about different types of ecosystems
- Quiz

Attendance

Daily Attendance Report for Class List: 2020-09-29

[Show Attendance Summary](#)

Class: Class List Meet ID: avn-flgc-fve Date: 2020-09-29 Earliest Arrival(s): 15:50 Start Time: 15:50 End Time: 17:18 Length of Meet: 88 min

21 Names (0 Absent) ☆	15:45	15:50	15:55	16:00	16:05	16:10	16:15	16:20	16:25	16:30	16:35	16:40	16:45	16:50	16:55	17:00	17:05	17:10	17:15	17:18
✓ Labani Barai																				
✓ Suttrishna Mandal																				
✓ Somnath Ghosh																				
✓ Sugata Biswas																				
✓ Dona Sarkar																				
✓ Subhojit Ray																				
✓ Susmita Biswas																				
✓ Swagata Mondal																				
✓ Pramita Chakraborty																				
✓ Rahul Debnath																				
✓ Sumana Sarmin																				
✓ Moumita Pal																				
✓ Kuheli Biswas																				
✓ Utsa Biswas																				
✓ Md Shorif Biswas																				
✓ Mrinmayee Biswas																				
✓ Arpita Bhowmick																				
✓ Anirban Sarkar																				
✓ Anindita Malakar																				
✓ Sakil Shaikh																				
✓ Laboni Karmakar																				

Daily Attendance Legend:

The student was present then exited rejoined and rejoined again etc etc (the alternating background patterns indicate that the student may have left and rejoined the Meet)
The student missed the entire class

Total Present: 21

DAY THREE (30.09.2020)**Day 3 - Session 1****10:00-11:00****Facilitator: Iftikar Rahaman****Module: Competition and its Evolution- I**

This module was focussed on:

- Lotka-Volterra Model of Competition
- Quiz

Outputs

- Establishing Lotka Volterra Equation of Competition
- Establishing Zero- Growth Isocline Equations
- Preparation of Zero- Growth Isocline Curves and Finding Status of Competition.
- Analyzing Stable and Unstable Equilibrium.
- Quiz on Module I

Attendance

Attendance for: Class 2 on 2020-09-30															
Names2020-09-30 9:59Arrival time															
anirban sarkar ✓ 10:00 (14min) [10:16]10:43 (0min) [10:43]															
mrinmayee biswas ✓ 10:05 (69min) [11:15]															
swagata mondal ✓ 9:59 (0min) [9:59]															
sumana sarmin ✓ 9:59 (3min) [10:02]															
susmita biswas ✓ 9:59 (1min) [10:00]															
anindita malakar ✓ 10:04 (10min) [10:16]11:12 (1min) [11:12]11:12 (1min) [11:16]															
arpita bhowmick ✓ 10:30 (0min) [10:30]10:33 (0min) [10:33]															
dona sarkar ✓ 9:59 (3min) [10:02]10:03 (58min) [11:01]11:03 (0min) [11:03]															
kuheli biswas ✓ 10:00 (14min) [10:16]10:17 (0min) [10:17]11:09 (0min) [11:09]															
labani barai ✓ 9:59 (75min) [11:15]															
moumita pal															
laboni karmakar ✓ 10:11 (3min) [10:14]10:15 (1min) [10:16]10:16 (0min) [10:16]10:22 (0min) [10:22]10:23 (1min) [10:23]10:33 (0min) [10:33]10:49 (0min) [10:49]															
utsa biswas ✓ 10:03 (68min) [11:15]															
pramita chakraborty ✓ 10:00 (15min) [10:14]10:25 (0min) [10:25]															
rahul debnath ✓ 10:00 (5min) [10:05]10:28 (0min) [10:28]															
sakil shaikh ✓ 10:02 (3min) [10:05]															
somnath ghosh ✓ 10:25 (1min) [11:16]															
sugata biswas ✓ 9:59 (2min) [10:02]10:41 (0min) [10:41]															
sutrishna mandal ✓ 10:21 (0min) [10:21]															
md.shorif biswas															
sharmistha mondal ✓ 10:23 (0min) [10:23]10:49 (0min) [10:49]															
subhojit ray ✓ 9:59 (0min) [9:59]10:00 (7min) [10:07]10:15 (13min) [11:15]															
ripan pal?10:00 (5min) [10:05]															

Total Present: 20

Day 3 - Session 2

16:00-17:00

Facilitator: Sri Bipul Sarkar

Module: Species Interaction-I

- Ecological interdependence and interactions
- Positive interactions
 - Mutualism
 - Commensalism

Outputs

- (i) Discussed about ecological interdependence and interactions among species.
- (ii) Detailed discussions are made on positive interactions: mutualism and commensalism

Attendance

Daily Attendance Report for Class List: 2020-09-30

[Show Attendance Summary](#)

Class: Class List Meet ID: avn-fkge-fve Date: 2020-09-30 ▼ Earliest Arrival(s): 15:59 Start Time: 15:59 End Time: 16:56 Length of Meet: 57 min

21 Names (0 Absent) ☆	15:55	15:59	16:00	16:05	16:10	16:15	16:20	16:25	16:30	16:35	16:40	16:45	16:50	16:55	16:56
✓ Subhojit Ray															
✓ Swagata Mondal															
✓ Laboni Karmakar															
✓ Sumana Sarmin															
✓ Susmita Biswas															
✓ Pramita Chakraborty															
✓ Sugata Biswas															
✓ Labani Barai															
✓ Kuheli Biswas															
✓ Sakil Shaikh															
✓ Dona Sarkar															
✓ Sharmistha Mondal															
✓ Mrinmayee Biswas															
✓ Anirban Sarkar															
✓ Utsa Biswas															
✓ Anindita Malakar															
✓ Ripan Pal															
✓ Somnath Ghosh															
✓ Rahul Debnath															
✓ Arpita Bhowmick															
✓ Sutrishna Mandal															

Daily Attendance Legend:

The student was present then exited rejoined and rejoined again etc. etc. (the alternating background patterns indicate that the student may have left and rejoined the Meet)

The student missed the entire class

Total Present: 21

Day 3 - Session 3

17:00-18:00

Facilitator: Dr Joydeb Bhattacharyya

Module: Knowledge of growth curve models-I

A quick review of the previous day's discussion was carried out. The discussions in this session are based on:

- Graphical representation of RGR and AGR in exponential growth
- Population density at any time in exponential growth
- Drawbacks of exponential growth model
- Logistic growth equation
- Population density at any time in logistic growth
- RGR for exponential and logistic growth

Outputs

- (i) Finding population density of exponential and logistic growth equations at any instant.
- (ii) Explained by means of some scientific data that human population growth is not exponential
- (iii) Identifying population growth equation from RGR curve obtained from field observations.

Attendance

Attendance for: Population Dynamics2020 on 2020-09-30

Names 2020-09-30 16:57 Arrival time

anindita malakar 17:01 (66min) [18:07]

anirban sarkar 17:03 (64min) [18:07]

arpita bhowmick 17:06 (14min) [17:19] 17:23 (44min) [18:07]

dona sarkar 17:01 (66min) [18:07]

labani barai 16:57 (17min) [17:14] 17:14 (53min) [18:07]

laboni karmakar 16:57 (70min) [18:07]

mrinmayee biswas 16:59 (68min) [18:07]

pramita chakraborty 17:00 (68min) [18:07]

rahul debnath 16:57 (70min) [18:07]

ripan pal 17:02 (66min) [18:07]

sakil shaikh 17:10 (58min) [18:07]

SHARMISTHA MONDAL 17:15 (12min) [17:27] 17:27 (34min) [18:01]

somnath ghosh 17:01 (66min) [18:07]

subhojit ray 16:57 (70min) [18:07]

sugata biswas 16:57 (64min) [18:01] 18:01 (6min) [18:07]

sumana sarmin 16:57 (28min) [18:07]

susmita biswas 16:57 (1min) [16:58] 16:59 (10min) [17:09]

sutrishna mandal 17:00 (5min) [17:05]

swagata mondal 16:59 (5min) [17:03]

utsa biswas 17:01 (0min) [17:01]

Total Present: 21

DAY FOUR (01.10.2020)**Day 4 - Session 1****09:00-10:00****Facilitator: Dr Joydeb Bhattacharyya****Module: Knowledge of growth curve models-II**

A quick review of the previous day's discussion was carried out. The first session of the fourth day covered the following topics:

- Point of inflexion and its significance in population growth models
- Point of inflexion in logistic growth curve
- Maximal growth rate in logistic equation
- Human population growth in the world since 1800AD and its AGR and RGR
- Population growth in India and China since 1970 and RGR
- Projecting future populations
- Stages of human population growth (pre & postindustrial and transitional)

Outputs

- (i) Finding points of inflexion of logistic equation
- (ii) Finding the population density in logistic growth at which the growth rate is maximum
- (iii) Finding RGR in human population growth from real field data
- (iv) Quiz

Attendance

Attendance for: Population Dynamics2020 on 2020-10-01

Names 2020-10-01 8:40 Arrival time

anindita malakar ✓ 8:48 (71min) [9:58]

anirban sarkar ✓ 8:51 (1min) [8:51] 8:54 (50min) [9:43]

arpita bhowmick ✓ 9:05 (35min) [9:40] 9:41 (9min) [9:52]

dona sarkar ✓ 8:47 (7min) [8:53] 8:54 (49min) [9:42] 9:59 (0min) [9:59]

kuheli biswas ? 8:44 (9min) [8:52] 8:53 (18min) [9:10] 9:11 (37min) [9:50]

labani barai ✓ 8:41 (66min) [9:46]

laboni karmakar ✓ 8:42 (72min) [9:53] 9:57 (2min) [9:58]

mrinmayee biswas ✓ 8:46 (70min) [9:58]

pramita chakraborty ✓ 8:43 (0min) [8:43] 8:44 (72min) [9:58]

rahu1 debnath ✓ 8:43 (48min) [9:30] 9:36 (19min) [9:54]

ripan pal ✓ 8:44 (65min) [9:49]

sakil shaikh ✓ 9:05 (31min) [9:35] 9:37 (14min) [9:53]

sharmistha mondal ✓ 8:49 (55min) [9:45]

somnath ghosh ✓ 9:18 (41min) [9:58]

subhojit ray ✓ 9:08 (7min) [9:14] 9:15 (41min) [9:58]

sumana sarmin ✓ 8:40 (54min) [9:53]

susmita biswas ✓ 8:47 (24min) [9:48]

sutrishna mandal ✓ 8:54 (12min) [9:05]

swagata mondal ✓ 8:44 (31min) [9:53]

utsa biswas ✓ 9:43 (8min) [9:50]

Total Present: 20

Day 4 - Session 2

10:00-11:00

Facilitator: Iftikar Rahaman

Module: Competition and its Evolution- II

Before Starting the session, a quick review of the previous day's discussion was carried out. This session of the fourth day covered the following topics:

- r-Selection Strategy and k- Selection Strategy
- Grime's Theory
- Character displacement

Outputs

- (i) Explanation of r- Selection and k- Selection Strategies in different ambience.
- (ii) Explaining Grime's Theory for Plant Strategists.
- (iii) Character displacement in the light of Competition.

Attendance

Attendance for: Class 4 on 2020-10-01					
Names	2020-10-01 10:01	Arrival time			
sumana sarmin	10:01 (6min)	[10:07]			
pramita chakraborty	10:01 (7min)	[10:08]			
sugata biswas	10:01 (1min)	[10:05]	10:12 (0min)	[10:12]	10:16 (0min) [10:16]
ripan pal	10:01 (7min)	[10:08]			
swagata mondal	10:01 (5min)	[10:06]			
rahul debnath	10:01 (2min)	[10:06]	10:07 (1min)	[10:08]	10:12 (0min) [10:12]
laboni karmakar	10:01 (30min)	[10:34]	10:34 (4min)	[10:38]	
labani barai	10:01 (0min)	[10:01]	10:05 (34min)	[10:39]	
sutrishna mandal	10:01 (0min)	[10:01]	10:04 (1min)	[10:04]	
dona sarkar	10:01 (36min)	[10:39]			
kuheli biswas	10:02 (7min)	[10:10]	10:11 (28min)	[10:39]	
susmita biswas	10:03 (0min)	[10:03]			
mrinmayee biswas	10:04 (5min)	[10:09]			
sakil shaikh	10:05 (2min)	[10:06]			
somnath ghosh	10:06 (0min)	[10:06]			
subhojit ray	10:06 (0min)	[10:06]			
anindita malakar	10:06 (33min)	[10:39]			
utsa biswas	10:08 (0min)	[10:08]	10:36 (0min)	[10:36]	
anirban sarkar	10:08 (31min)	[10:39]			
arpita bhowmick	10:09 (30min)	[10:39]			
Md.Shorif Biswas	10:11 (22min)	[10:39]			

Total Present: 21

Day 4 - Session 3

16:00-17:00

Facilitator: Sri Bipul Sarkar

Module: Species Interaction-II

A quick review of the previous day's discussion was carried out. This session of the fourth day covered the following topics:

- Negative interactions
 - Parasitism
 - Amensalism
 - Competition

Outputs

- (i) Detailed discussions are made on negative interactions: predation, amensalism and competition
- (ii) Quiz

Attendance

Daily Attendance Report for Class List: 2020-10-01

[Show Attendance Summary](#)

Class: **Class List** Meet ID: **avn-flkgc-fwe** Date: **2020-10-01** Earliest Arrival(s): **15:57** Start Time: **15:57** End Time: **17:13** Length of Meet: **76 min**

20 Names (0 Absent) ☆	15:55	15:57	16:00	16:05	16:10	16:15	16:20	16:25	16:30	16:35	16:40	16:45	16:50	16:55	17:00	17:05	17:10	17:13
✓ Labani Barai																		
✓ Kuheli Biswas																		
✓ Susmita Biswas																		
✓ Sumana Sarmin																		
✓ Pramita Chakraborty																		
✓ Sugata Biswas																		
✓ Subhojit Ray																		
✓ Mrinmayee Biswas																		
✓ Swagata Mondal																		
✓ Rahul Debnath																		
✓ Anindita Malakar																		
✓ Laboni Karmakar																		
✓ Sutishna Mandal																		
✓ Ripan Pal																		
✓ Arpita Bhowmick																		
✓ Sakil Shaikh																		
✓ Dona Sarkar																		
✓ Md. Shorif Biswas																		
✓ Somnath Ghosh																		
✓ Anirban Sarkar																		

Daily Attendance Legend:

The student was present then exited rejoined and rejoined again etc etc (the alternating background patterns indicate that the student may have left and rejoined the Meet)
 The student missed the entire class

Total Present: 20

Page 20 of 42

Day 5 - Session 2

16:00-17:00

Facilitator: Sri Bipul Sarkar

Module: Metapopulation Dynamics-I

A quick review of the previous day's discussion was carried out. This session of the fifth day covered the following topics:

- Definition and composition or structure
- Habitat fragmentation and reasons
- Condition of metapopulations
- Dynamics of metapopulation: Dispersal and Colonization

Outputs

- Definition and various components and conditions of metapopulation are thoroughly discussed.
- Habitat fragmentations and reasons are discussed.
- Expression of dynamics of metapopulations are discussed.

Attendance

Daily Attendance Report for Class List: 2020-10-03

[Show Attendance Summary](#)

Class: Class List Meet ID: avn-fkge-fwe Date: 2020-10-03 Earliest Arrival(s): 15:58 Start Time: 15:58 End Time: 17:10 Length of Meet: 72 min

19 Names (0 Absent) ☆	15:55	15:58	16:00	16:05	16:10	16:15	16:20	16:25	16:30	16:35	16:40	16:45	16:50	16:55	17:00	17:05	17:10
✓ Laboni Karmakar																	
✓ Sumana Sarmin																	
✓ Subhojit Ray																	
✓ Pramita Chakraborty																	
✓ Swagata Mondal																	
✓ Dona Sarkar																	
✓ Labani Barai																	
✓ Kuheli Biswas																	
✓ Anindita Malakar																	
✓ Utsa Biswas																	
✓ Ripan Pal																	
✓ Sharmistha Mondal																	
✓ Sakil Shaikh																	
✓ Somnath Ghosh																	
✓ Rahul Debnath																	
✓ Sutrishna Mandal																	
✓ Mrinmayee Biswas																	
✓ Susmita Biswas																	
✓ Md. Shorif Biswas																	

Daily Attendance Legend:

The student was present then exited rejoined and rejoined again etc etc (the alternating background patterns indicate that the student may have left and rejoined the Meet)

The student missed the entire class

Total Present: 19

Facilitator: Dr Joydeb Bhattacharyya

A quick review of the previous day's discussion was carried out. The first session of the sixth day covered the following topics:

- Growth acceleration and retardation in logistic growth equation
- Gompertz growth equation
- Logistic versus Gompertz growth
- Modified logistic growth with variable carrying capacity

- (i) Finding the phases of growth acceleration and growth retardation in logistic growth
- (ii) Proving that logistic growth curve has a greater initial growth acceleration compared to that of Gompertz growth
- (iii) Modified logistic growth equations in adaptive systems

Attendance for: Population Dynamics2020 on 2020-10-05

[illegible]

Total Present: 22

Day 6 – Session 2

10:00-11:00

Facilitator: Iftikar Rahaman

Module: Community Ecology- II

Before starting the session, a quick review of the previous day's discussion was carried out. This session of the Sixth day covered the following topics:

- Community Succession

Outputs

- Understanding Succession with respect to Community.
- Understanding Community Succession in the light of Evolution.

Attendance

Attendance for: Class 5 on 2020-10-05									
Names	2020-10-05	10:00	Arrival time						
labani barai	✓	10:00 (0min)	[10:00]	10:01 (8min)	[10:55]				
sumana sarmin	✓	10:02 (8min)	[10:35]						
ripan pal	✓	10:02 (42min)	[10:54]						
sutrishna mandal									
sugata biswas	✓	10:01 (5min)	[10:18]	10:32 (3min)	[10:35]				
anirban sarkar	✓	10:01 (7min)	[10:55]						
kuheli biswas	✓	10:00 (55min)	[10:55]						
pramita chakraborty	✓	10:00 (12min)	[10:35]						
rahul debnath	✓	10:00 (4min)	[10:04]	10:04 (27min)	[10:54]				
subhojit ray	✓	10:01 (7min)	[10:07]	10:11 (6min)	[10:39]	10:50 (0min)	[10:50]		
sakil shaikh	✓	10:02 (33min)	[10:46]	10:47 (0min)	[10:47]				
utsa biswas									
dona sarkar	✓	10:00 (2min)	[10:03]	10:06 (4min)	[10:55]				
somnath ghosh									
swagata mondal	✓	10:04 (8min)	[10:35]						
mrinmayee biswas	✓	10:16 (2min)	[10:18]	10:18 (0min)	[10:18]	10:20 (3min)	[10:35]	10:47 (1min)	[10:55]
sharmistha mondal	✓	10:07 (41min)	[10:56]						
susmita biswas	✓	10:02 (0min)	[10:02]	10:04 (8min)	[10:35]				
laboni karmakar	✓	10:04 (5min)	[10:10]	10:31 (0min)	[10:31]	10:45 (1min)	[10:55]		
anindita malakar	✓	10:05 (50min)	[10:55]						
md.shorif biswas		10:00 (38min)	[10:38]	10:39 (8min)	[10:54]				
arpita bhowmick		10:06 (3min)	[10:10]	10:40 (1min)	[10:55]				

Total Present: 19

Day 6 - Session 3

16:00-17:00

Facilitator: Sri Bipul Sarkar

Module: Metapopulation Dynamics-II

A quick review of the previous day's discussion was carried out. This session of the fourth day covered the following topics:

- Metapopulation models
 - Levins model
 - Mainland-island model
 - Source-sink model
 - Landscape model

Outputs

- (i) Expressions and features of different metapopulation dynamics models are obtained.
- (ii) Quiz

Attendance

Daily Attendance Report for Class List: 2020-10-05

[Show Attendance Summary](#)

Class: Class List Meet ID: avn-fkge-fwe Date: 2020-10-05 Earliest Arrival(s): 16:00 Start Time: 16:00 End Time: 17:15 Length of Meet: 75 min

20 Names (0 Absent) ☆	15:55	16:00	16:05	16:10	16:15	16:20	16:25	16:30	16:35	16:40	16:45	16:50	16:55	17:00	17:05	17:10	17:15
✓ Md. Shorif Biswas																	
✓ Sumana Sarmin																	
✓ Pramita Chakraborty																	
✓ Susmita Biswas																	
✓ Dona Sarkar																	
✓ Subhojit Ray																	
✓ Kuheli Biswas																	
✓ Sugata Biswas																	
✓ Laboni Karmakar																	
✓ Labani Barai																	
✓ Mrinmayee Biswas																	
✓ Rahul Debnath																	
✓ Sharmistha Mondal																	
✓ Somnath Ghosh																	
✓ Swagata Mondal																	
✓ Ripan Pal																	
✓ Anindita Malakar																	
✓ Sutrisna Mandal																	
✓ Anirban Sarkar																	
✓ Sakil Shaikh																	

Daily Attendance Legend:

The student was present then exited rejoined and rejoined again etc etc (the alternating background patterns indicate that the student may have left and rejoined the Meet)

The student missed the entire class

Total Present: 20

Day 6 - Session 4

17:00-18:00

Facilitator: Dr Joydeb Bhattacharyya

Module: Extended family of growth curve models-II

The final session of the sixth day covered the following topics:

- Allee effect in growth equations
- Weak Allee effect
- Strong Allee effect

Outputs

- (i) Difference between Weak and Strong Allee effects
- (ii) Quiz

Attendance

Attendance for: Population Dynamics2020 on 2020-10-05

Names 2020-10-05 17:04 Arrival time

anindita malakar ✓ 17:14 (5min) [17:28]

anirban sarkar ✓ 17:14 (0min) [17:14]

kuheli biswas ✓ 17:20 (0min) [17:20] 17:39 (0min) [17:39]

labani barai ✓ 17:14 (0min) [17:14] 17:44 (0min) [17:44]

laboni karmakar ✓ 17:14 (0min) [17:14] 17:28 (0min) [17:28]

mrinmayee biswas ✓ 17:14 (0min) [17:14]

pramita chakraborty ✓ 17:20 (0min) [17:20] 17:20 (0min) [17:20]

rahul debnath ✓ 17:14 (8min) [17:35]

ripan pal ✓ 17:14 (0min) [17:14]

sakil shaikh ✓ 17:14 (5min) [17:28] 17:30 (1min) [17:31]

sharmistha mondal ✓ 17:35 (0min) [17:35] 17:39 (0min) [17:39]

somnath ghosh ✓ 17:27 (3min) [17:31] 17:39 (0min) [17:39]

subhojit ray ✓ 17:20 (2min) [17:22] 17:29 (2min) [17:31] 17:35 (0min) [17:35]

sugata biswas ✓ 17:20 (8min) [17:35]

sumana sarmin ✓ 17:14 (7min) [17:31]

Total Present: 15

DAY SEVEN (06.10.2020)**Day 7 - Session 1****10:00-11:00****Facilitator: Iftikar Rahaman****Module: Community Dynamics - I**

This session of the seventh day covered the following topics:

- Stability in a Community
- Equilibrium Points
- Quiz

Outputs

- Understanding of Local and Global Stability.
- Explaining Equilibrium Points in a Community.
- Quiz on Community Ecology Module

Attendance

Attendance for: Class 5 on 2020-10-06

Names	2020-10-06 10:00	Arrival time							
labani barai	✓	10:00 (11min)	[10:11]						
sumana sarmin	✓	10:04 (4min)	[10:08]						
ripan pal	✓	10:04 (15min)	[10:29]	10:30 (0min)	[10:30]				
sutrishna mandal									
sugata biswas	✓	10:00 (4min)	[10:04]	10:09 (0min)	[10:09]	10:28 (0min)	[10:28]		
anirban sarkar	✓	10:20 (0min)	[10:20]						
kuheli biswas	✓	10:00 (11min)	[10:11]	10:46 (0min)	[10:46]				
pramita chakraborty	✓	10:00 (11min)	[10:11]	10:44 (0min)	[10:44]				
rahul debnath	✓	10:00 (59min)	[11:07]						
subhojit ray	✓	10:00 (4min)	[10:04]	11:08 (0min)	[11:08]				
sakil shaikh	✓	10:30 (0min)	[10:30]						
utsa biswas	✓	10:06 (15min)	[10:20]	10:21 (31min)	[11:07]				
dona sarkar	✓	10:02 (9min)	[10:11]						
somnath ghosh	✓	10:13 (19min)	[10:36]						
swagata mondal	✓	10:00 (5min)	[10:05]						
mrinmayee biswas	✓	10:00 (67min)	[11:07]						
sharmistha mondal	✓	10:12 (8min)	[10:22]	10:24 (0min)	[10:24]	10:34 (1min)	[10:34]	10:43 (0min)	[10:43]
susmita biswas	✓	10:05 (13min)	[10:36]						
laboni karmakar	✓	10:03 (13min)	[10:20]	10:26 (0min)	[10:26]	10:57 (0min)	[10:57]	11:09 (1min)	[11:09]
anindita malakar	✓	10:14 (0min)	[10:14]	11:08 (0min)	[11:08]				
md.shorif biswas	✓	10:12 (0min)	[10:12]	10:36 (31min)	[11:07]				
arpita bhowmick	✓	10:04 (8min)	[10:11]						

Total Present: 21

Day 7 - Session 2

16:00-17:00

Facilitator: Sri Bipul Sarkar

Module: Biodiversity Parameters-I

A quick review of the previous day's discussion was carried out. This session of the seventh day covered the following topics:

- Definition of biodiversity
- Levels of biodiversity
- Components and gradients of biodiversity
- Biodiversity of India
- Uses of biodiversity

Outputs

- Various knowledges are gained about biodiversity, its levels and components.
- Detailed informations are gathered about biodiversity of India and know about uses of biodiversity.

Attendance

Daily Attendance Report for Class List: 2020-10-06

[Show Attendance Summary](#)

Class: Class List Meet ID: avn-fkge-five Date: 2020-10-06 Earliest Arrival(s): 15:59 Start Time: 15:59 End Time: 17:12 Length of Meet: 73 min

19 Names (0 Absent) ☆	15:55	15:59	16:00	16:05	16:10	16:15	16:20	16:25	16:30	16:35	16:40	16:45	16:50	16:55	17:00	17:05	17:10	17:12
✓ Laboni Karmakar																		
✓ Labani Barai																		
✓ Sugata Biswas																		
✓ Sumana Sarmin																		
✓ Mrinmayee Biswas																		
✓ Pramita Chakraborty																		
✓ Kuheli Biswas																		
✓ Sharmistha Mondal																		
✓ Swagata Mondal																		
✓ Ripan Pal																		
✓ Rahul Debnath																		
✓ Susmita Biswas																		
✓ Dona Sarkar																		
✓ Sakil Shaikh																		
✓ Somnath Ghosh																		
✓ Utsa Biswas																		
✓ Subhojit Ray																		
✓ Md Shorif Biswas																		
✓ Anindita Malakar																		

Daily Attendance Legend:

The student was present then exited rejoined and rejoined again etc etc (the alternating background patterns indicate that the student may have left and rejoined the Meet)

The student missed the entire class

Total Present: 19

Day 7 - Session 3

17:00-18:00

Facilitator: Dr Joydeb Bhattacharyya

Module: Model selection diagnostics-I

A quick review of the previous day's discussion was carried out. The discussions of this session are based on:

- Two-species population growth models
- Food Pyramid, Niche, Habitat
- Relations between Habitat and Niche with examples
- Competitive exclusion principle

Outputs

- (i) Learning how habitat and niche are interrelated
- (ii) Explained what would happen if organisms evolve into the same niche and the same habitat

Attendance

Attendance for: Population Dynamics2020 on 2020-10-06

Names 2020-10-06 16:57 Arrival time

anindita malakar ✓ 17:46 (37min) [18:23]

arpita bhowmick ✓ 17:19 (60min) [18:19]

dona sarkar ✓ 17:17 (66min) [18:23]

kuheli biswas ✓ 17:20 (63min) [18:23]

labani barai ✓ 17:12 (71min) [18:23]

laboni karmakar ✓ 17:12 (71min) [18:23]

mrinmayee biswas ✓ 17:15 (68min) [18:23]

pramita chakraborty ✓ 17:14 (38min) [17:52] 17:52 (31min) [18:23]

raahul debnath ✓ 17:13 (10min) [17:23] 17:24 (1min) [17:25] 17:30 (16min) [17:46] 17:47 (36min) [18:23]

ripan pal ✓ 17:16 (67min) [18:23]

sakil shaikh ✓ 17:13 (44min) [17:57]

sharmistha mondal ✓ 17:21 (12min) [17:33]

somnath ghosh ✓ 17:22 (16min) [17:38]

subhojit ray ✓ 17:15 (45min) [18:00] 18:01 (4min) [18:05] 18:05 (18min) [18:23]

sugata biswas ✓ 17:12 (71min) [18:23]

susmita biswas ✓ 17:12 (34min) [17:46] 17:46 (37min) [18:23]

sutrishna mandal

swagata mondal ✓ 17:18 (20min) [17:43] 17:44 (39min) [18:23]

utsa biswas ✓ 17:17 (13min) [17:47] 17:57 (4min) [18:01]

Total Present: 18

DAY EIGHT (07.10.2020)

Day 8 - Session 1

09:00-10:00

Facilitator: Dr Joydeb Bhattacharyya

Module: Model selection diagnostics-II

A quick review of the previous day's discussion was carried out. The first session of the eighth day covered the following topics:

- Two-species interactions (mutualism, competition, predation, parasitism, commensalism, amensalism)
- Generic prey-predator model
- Lotka-Volterra competition model

Outputs

- (i) Explained with examples the different types of species interactions
- (ii) Students learned to distinguish between a prey-predator model and a competition model
- (iii) Quiz

Attendance

Attendance for: Population Dynamics2020 on 2020-10-07

Names 2020-10-07 8:23 Arrival time

anindita malakar ✓ 9:27 (12min) [9:48]

anirban sarkar ✓ 9:06 (33min) [9:48]

dona sarkar ✓ 8:44 (52min) [9:44]

kuheli biswas ✓ 8:32 (55min) [9:27] 9:27 (6min) [9:33]

labani barai ✓ 8:23 (70min) [9:33]

laboni karmakar ✓ 8:28 (44min) [9:12] 9:14 (27min) [9:50] 9:59 (1min) [10:00]

md.shorif biswas ? 9:07 (1min) [9:08] 9:08 (28min) [9:45]

mrinmayee biswas ✓ 8:32 (79min) [10:00]

pramita chakraborty ✓ 8:27 (66min) [9:33]

rahul debnath ✓ 8:56 (29min) [9:25] 9:25 (8min) [9:33] 9:54 (5min) [9:59]

ripan pal ✓ 8:30 (63min) [9:33]

sakil shaikh ✓ 9:24 (14min) [9:47]

sharmistha mondal ✓ 8:47 (16min) [9:03] 9:13 (21min) [9:43]

subhojit ray ✓ 8:27 (3min) [8:30] 8:31 (76min) [9:56]

sugata biswas ✓ 8:30 (56min) [9:26] 9:29 (4min) [9:33] 10:00 (0min) [10:00]

susmita biswas ✓ 8:33 (56min) [9:29]

swagata mondal ✓ 8:30 (55min) [9:27]

utsa biswas ✓ 8:32 (42min) [9:14]

Total Present: 18

Day 8 - Session 2

10:00-11:00

Facilitator: Iftikar Rahaman

Module: Community Dynamics - II

Before starting the session, a quick review of the previous day's discussion was carried out.

This session of the eight day covered the following topics:

- Non-equilibrium regulations of Community maintenance.
- Dynamic Equilibrium Theory

Outputs

- Explaining Top-down and Bottom-up regulations.
- Understanding of Dynamic Equilibrium Theory of Island Biogeography.

Attendance

Attendance for: Class 5 on 2020-10-07

Names 2020-10-07 10:15 Arrival time

labani barai ✓ 10:15 (53min) [11:21]

sumana sarmin

ripan pal ✓ 10:15 (20min) [11:22]

sutrishna mandal

sugata biswas ✓ 10:15 (4min) [10:19] 10:21 (0min) [10:21] 10:26 (27min) [11:21]

anirban sarkar ✓ 10:29 (1min) [10:52]

kuheli biswas ✓ 10:15 (17min) [10:39] 10:39 (10min) [10:49] 10:51 (0min) [10:51] 10:57 (0min) [10:57] 11:00 (0min) [11:00] 11:06 (0min) [11:06] 11:08 (0min) [11:08]

pramita chakraborty ✓ 10:15 (8min) [10:24] 10:38 (0min) [10:38] 10:54 (0min) [10:54]

rahul debnath ✓ 10:16 (8min) [10:24] 10:28 (0min) [10:28] 10:42 (0min) [10:42] 10:52 (2min) [10:54] 11:02 (1min) [11:22]

subhojit ray ✓ 10:15 (1min) [10:16] 10:44 (1min) [11:22]

sakil shaikh ✓ 10:16 (0min) [10:16]

utsa biswas ✓ 10:18 (4min) [10:22] 10:23 (28min) [10:51] 10:51 (0min) [10:51] 11:13 (0min) [11:13]

dona sarkar ✓ 10:17 (7min) [10:25] 10:27 (0min) [10:27]

somnath ghosh ✓ 10:17 (1min) [10:18]

swagata mondal ✓ 10:16 (0min) [10:16] 10:44 (0min) [10:44] 11:00 (0min) [11:00]

mrinmayee biswas ✓ 10:16 (57min) [11:13]

sharmistha mondal ✓ 10:25 (6min) [10:32] 10:33 (0min) [10:33]

susmita biswas ✓ 10:16 (0min) [10:16] 10:54 (0min) [10:54] 11:10 (0min) [11:10]

laboni karmakar ✓ 10:18 (7min) [10:25] 10:29 (0min) [10:29] 10:48 (0min) [10:48] 11:00 (0min) [11:00]

anindita malakar ✓ 10:18 (7min) [10:25]

md.shorif biswas ✓ 10:27 (1min) [10:27] 10:31 (0min) [10:31] 10:31 (0min) [10:31] 10:47 (32min) [11:21]

arpita bhowmick ✓ 10:23 (2min) [10:25] 10:31 (0min) [10:31]

pijush shil 10:25 (0min) [10:25] 10:34 (1min) [11:22]

Total Present: 20

Day 8 – Session 3

16:00-17:00

Facilitator: Sri Bipul Sarkar

Module: Biodiversity Parameters-II

A quick review of the previous day's discussion was carried out. This session of the eight day covered the following topics:

- Threats to biodiversity
- Extinction of species
- IUCN Red List categories and their criteria

Outputs

- Some very important topics are discussed i.e. ever-increasing threats to biodiversity and rate and reasons for extinction of species.
- Thoroughly discussed about IUCN Red list categories of species and their criteria
- Quiz

Attendance

Daily Attendance Report for Class List: 2020-10-07

[Show Attendance Summary](#)

Class: Class List Meet ID: avn-fkge-five Date: 2020-10-07 Earliest Arrival(s): 16:08 Start Time: 16:08 End Time: 17:26 Length of Meet: 78 min

19 Names (0 Absent) ☆	16:05	16:06	16:10	16:15	16:20	16:25	16:30	16:35	16:40	16:45	16:50	16:55	17:00	17:05	17:10	17:15	17:20	17:25	17:26
✓ Labani Barai																			
✓ Pramita Chakraborty																			
✓ Sugata Biswas																			
✓ Laboni Karmakar																			
✓ Swagata Mondal																			
✓ Subhojit Ray																			
✓ Kuheli Biswas																			
✓ Rahul Debnath																			
✓ Somnath Ghosh																			
✓ Dona Sarkar																			
✓ Anirban Sarkar																			
✓ Mrinmayee Biswas																			
✓ Ripan Pal																			
✓ Utsa Biswas																			
✓ Sharmistha Mondal																			
✓ Anindita Malakar																			
✓ Susmita Biswas																			
✓ Md Shorif Biswas																			
✓ Arpita Bhowmick																			

Daily Attendance Legend:

The student was present then exited rejoined and rejoined again etc etc (the alternating background patterns indicate that the student may have left and rejoined the Meet)
The student missed the entire class

Total Present: 19

Facilitator: Iftikar Rahaman

This session of the penultimate day covered the following topics:

- Niche Concept
- Huthinson's n-dimensional Niche Axes
- Quiz

- (i) Detailed understanding of Niche definition.
- (ii) Explaining Fundamental Niche and Realized Niche.
- (iii) Understanding n-dimensional Niche Axes.
- (iv) Quiz on Community Dynamics.

Attendance for: Class 5 on 2020-10-08

Attendance for: Class 5 on 2020-10-08							
Names2020-10-08 10:15Arrival time							
labani barai ✓	10:15 (0min)	[10:15]	10:16 (3min)	[10:20]	10:22 (0min)	[10:22]	10:44 (4min) [10:54]
sumana sarmin ✓	10:15 (18min)	[11:04]					
ripan pal ✓	10:17 (3min)	[11:05]					
sutrishna mandal ✓	10:15 (0min)	[10:15]	10:20 (3min)	[10:22]	10:43 (1min)	[11:05]	
sugata biswas ✓	10:16 (3min)	[10:18]	10:20 (0min)	[10:20]	10:34 (0min)	[10:34]	10:39 (0min) [10:39]10:51 (0min) [10:51]
anirban sarkar ✓	10:17 (1min)	[10:18]	10:21 (18min)	[11:04]			
kuheli biswas ✓	10:16 (6min)	[10:22]	10:35 (0min)	[10:35]	10:37 (1min)	[10:47]	
pramita chakraborty ✓	10:15 (4min)	[10:47]					
raahul debnath ✓	10:15 (11min)	[11:04]					
subhojit ray ✓	10:15 (2min)	[10:17]					
sakil shaikh ✓	10:25 (2min)	[10:27]					
utsa biswas ✓	10:17 (0min)	[10:17]					
dona sarkar ✓	10:19 (5min)	[10:54]					
somnath ghosh ✓	10:16 (4min)	[10:20]					
swagata mondal ✓	10:15 (5min)	[10:20]	10:22 (40min)	[11:04]			
mrinmayee biswas ✓	10:17 (40min)	[11:04]					
sharmistha mondal ✓	10:18 (2min)	[11:04]					
susmita biswas ✓	10:16 (0min)	[10:16]	10:22 (0min)	[10:22]	10:27 (0min)	[10:27]	10:33 (15min) [11:05]
laboni karmakar ✓	10:17 (19min)	[10:54]					
anindita malakar ✓	10:26 (1min)	[10:47]	10:49 (7min)	[11:03]			
md.shorif biswas ✓	10:15 (33min)	[10:54]					
arpita bhowmick ✓	10:18 (2min)	[10:20]	10:23 (0min)	[10:23]	10:42 (4min)	[10:54]	
pijush shil							

Page 32 of 42

Day 9 - Session 2

16:00-17:00

Facilitator: Sri Bipul Sarkar

Module: Biodiversity Regulations-I

A quick review of the previous day's discussion was carried out. This session of the penultimate day covered the following topics:

- Conservation of biodiversity
- *In-situ* conservation
 - Protected areas, National parks, Biosphere reserves, Sanctuaries etc.
- *Ex-situ* conservation
 - Botanical garden, Zoological garden, Gene bank, Seed bank
- Biodiversity hotspots

Outputs

- (i) Detailed discussions are made on biodiversity conservation and their types
- (ii) Students learned about *in-situ*, *ex-situ* conservation, biodiversity hotspots and knowledges about them are obtained.

Attendance

Daily Attendance Report for Class List: 2020-10-08

[Show Attendance Summary](#)

Class: Class List Meet ID: avn-fkgc-fwe Date: 2020-10-08 Earliest Arrival(s): 15:55 Start Time: 15:55 End Time: 17:15 Length of Meet: 80 min

19 Names (0 Absent) ☆	15:50	15:55	16:00	16:05	16:10	16:15	16:20	16:25	16:30	16:35	16:40	16:45	16:50	16:55	17:00	17:05	17:10	17:15
✓ Labani Barai																		
✓ Sumana Sarmin																		
✓ Sugata Biswas																		
✓ Laboni Karmakar																		
✓ Subhojit Ray																		
✓ Susmita Biswas																		
✓ Dona Sarkar																		
✓ Ripan Pal																		
✓ Sharmistha Mondal																		
✓ Pramita Chakraborty																		
✓ Minmayee Biswas																		
✓ Somnath Ghosh																		
✓ Swagata Mondal																		
✓ Kuheli Biswas																		
✓ Md Shorif Biswas																		
✓ Rahul Debnath																		
✓ Sakil Shaikh																		
✓ Utsa Biswas																		
✓ Anindita Malakar																		

Daily Attendance Legend:

The student was present then exited rejoined and rejoined again etc etc (the alternating background patterns indicate that the student may have left and rejoined the Meet)

The student missed the entire class

Total Present: 19

Day 9 - Session 3

17:00-18:00

Facilitator: Dr Joydeb Bhattacharyya

Module: Mathematical models-I

A quick review of the previous day's discussion was carried out. The discussions of this session are based on:

- Predator functional response
- Holling Disk equation
- Holling-I vs Holling-II functional responses with examples
- Hill function and its applicability
- Holling-III functional response with examples

Outputs

- (i) Derivation of Holling-II functional response by considering searching time and handling time of the predators while predating the preys
- (ii) Derivation of Hill function
- (iii) Holling-III functional response as a special case of Hill function

Attendance

Attendance for: Population Dynamics2020 on 2020-10-08

Names 2020-10-08 16:59 Arrival time

anindita malakar ✓ 17:22 (54min) [18:16]
 dona sarkar ✓ 17:12 (64min) [18:16]
 labani barai ✓ 17:14 (63min) [18:16]
 laboni karmakar ✓ 17:13 (63min) [18:16]
 md.shorif biswas ✓ 17:21 (55min) [18:16]
 mrinmayee biswas ✓ 17:14 (1min) [17:15] 17:15 (61min) [18:16]
 pramita chakraborty ✓ 17:13 (63min) [18:16]
 rahul debnath ✓ 17:02 (0min) [17:02] 17:13 (19min) [17:32] 17:34 (43min) [18:16]
 ripan pal ✓ 17:14 (63min) [18:16]
 sakil shaikh ✓ 17:18 (30min) [17:48] 17:57 (12min) [18:08] 18:16 (1min) [18:16]
 sharmistha mondal ✓ 17:30 (31min) [18:01] 18:03 (5min) [18:08]
 somnath ghosh ✓ 17:14 (62min) [18:16]
 subhojit ray ✓ 17:14 (59min) [18:16]
 sugata biswas ✓ 17:13 (2min) [17:15] 17:15 (38min) [17:53] 17:54 (18min) [18:15]
 sumana sarmin ✓ 17:15 (50min) [18:05]
 susmita biswas ✓ 17:17 (1min) [17:18] 17:19 (13min) [17:49]
 sutrishna mandal ✓ 17:49 (9min) [18:03]
 swagata mondal ✓ 17:15 (8min) [17:54]
 utsa biswas ✓ 17:18 (3min) [17:21] 17:21 (0min) [17:21]

Total Present: 19

DAY TEN (09.10.2020)

Day 10 - Session 1

09:00-10:00

Facilitator: Dr Joydeb Bhattacharyya

Module: Mathematical models-II

A quick review of the previous day's discussion was carried out. The first session of the final day covered the following topics:

- Lotka-Volterra model
- Finding equilibrium points (steady state solutions)
- Eigenvalue analysis and using Routh-Hurwitz's sufficient condition for stability

Outputs

- (i) Students learned how to analyze Lotka-Volterra mathematical model by finding the steady state solutions.
- (ii) Students learned to perform stability analysis of a model by eigenvalue analysis
- (iii) Quiz

Attendance

Daily Attendance Report for Population Dynamics2020: 2020-10-09

[Show Attendance Summary](#)

Class: Population Dynamics2020 Meet ID: equ-csr-hio Date: 2020-10-09 v Earliest Arrival(s): 08:24 Start Time: 8:24 End Time: 10:00 Length of Meet: 96 min

22 Names (0 Absent) *	Arr	min	Last	8:24	8:25	8:30	8:35	8:40	8:45	8:50	8:55	9:00	9:05	9:10	9:15	9:20	9:25	9:30	9:35	9:40	9:45	9:50	9:55	10:00
✓ Anindita Mallick	8:41	58	9:46																					
✓ Anirban Sarkar	8:59	31	9:32																					
✓ Arpita Bhattacharya	9:10	20	9:32																					
✓ Dona Sarkar	8:33	57	9:32																					
✓ Kibeli Biswas	8:30	60	9:32																					
✓ Labani Barai	8:25	67	10:00																					
✓ Laboni Karmakar	8:29	79	9:52																					
✓ Md Shorif Biswas	9:00	56	10:00																					
✓ Minmayee Biswas	8:45	45	9:29																					
✓ Pranita Chakraborty	8:30	63	9:38																					
✓ Rakul Debnath	8:41	58	9:57																					
✓ Ripan Pal	8:30	62	9:32																					
✓ Sakil Shaikh	9:29	8	9:43																					
✓ Sharmistha Mondal	8:41	32	9:12																					
✓ Somnath Ghosh	8:40	56	9:48																					
✓ Subhojit Ray	8:34	79	10:00																					
✓ Sugata Biswas	8:34	72	10:00																					
✓ Sumata Sarmin	8:27	74	9:50																					
✓ Sumita Biswas	8:33	54	9:29																					
✓ Sutrisna Mandal	9:02	28	9:29																					
✓ Swagata Mondal	8:30	45	9:29																					
✓ Utsa Biswas	8:32	38	9:40																					

Daily Attendance Legend:

The student was present then exited rejoined and rejoined again etc. etc. (the alternating background patterns indicate that the student may have left and rejoined the Meet)

The student missed the entire class

Total Present: 22

Day 10- Session 2

10:00-11:00

Facilitator: Iftikar Rahaman

Module: Ecological Niche - II

Before starting the session, a quick review of the previous day's discussion was carried out. This session of the tenth day covered the following topics:

- Competitive Exclusion Theory
- Niche Differentiation
- Quiz

Outputs

- (i) Understanding of Competitive Exclusion.
- (ii) Explaining Niche differentiation.
- (iii) Quiz on Ecological Niche Module.

Attendance

Attendance for: Class 5 on 2020-10-09							
Names	2020-10-09 10:15	Arrival time					
labani barai ✓	10:15 (53min)	[11:20]					
sumana sarmin ✓	10:16 (19min)	[11:20]					
ripan pal ✓	10:17 (3min)	[10:29]					
sutrishna mandal ✓	10:15 (21min)	[10:36]11:04 (4min)	[11:20]				
sugata biswas ✓	10:15 (27min)	[11:20]					
anirban sarkar ✓	10:21 (6min)	[10:27]10:36 (15min)	[11:20]				
kuheli biswas ✓	10:20 (2min)	[10:22]10:25 (16min)	[10:40]10:42 (4min)	[11:03]11:13 (1min)	[11:15]11:16 (1min)	[11:20]	
pramita chakraborty ✓	10:16 (5min)	[10:29]10:34 (34min)	[11:20]				
raahul debnath ✓	10:15 (4min)	[10:29]10:35 (1min)	[11:20]				
subhojit ray ✓	10:15 (10min)	[11:20]					
sakil shaikh ✓	10:27 (1min)	[10:29]10:45 (6min)	[11:20]				
utsa biswas ✓	10:20 (0min)	[10:20]10:45 (0min)	[10:45]10:46 (15min)	[11:19]			
dona sarkar ✓	10:18 (51min)	[11:20]					
somnath ghosh ✓	10:19 (6min)	[11:20]					
swagata mondal ✓	10:16 (21min)	[11:20]					
mrimmayee biswas ✓	10:16 (64min)	[11:20]					
sharmistha mondal ✓	10:21 (1min)	[10:29]11:12 (6min)	[11:20]				
susmita biswas ✓	10:20 (6min)	[11:19]					
laboni karmakar ✓	10:17 (23min)	[10:40]10:44 (4min)	[11:03]11:06 (3min)	[11:20]			
anindita malakar ✓	10:18 (27min)	[11:16]					
md.shorif biswas ✓	10:15 (16min)	[10:35]					
arpita bhowmick ✓	10:19 (30min)	[11:19]					
pijush shil							

Total Present: 22

Day 10 - Session 3

16:00-17:00

Facilitator: Sri Bipul Sarkar

Module: Biodiversity Regulations-II

A quick review of the previous day's discussion was carried out. This session of the final day covered the following topics:

- Biodiversity conservations
- International strategies
- National strategies
- Biogeographic classifications of India

Outputs

- Some important and necessary national and international strategies for biodiversity conservation of ecosystem were discussed and information of these strategies are gathered among students.
- Also discussed about Biogeographic classifications of India
- Quiz

Attendance

Daily Attendance Report for Class List: 2020-10-09

[Show Attendance Summary](#)

Class: Class List Meet ID: avn-fkgc-fwe Date: 2020-10-09 Earliest Arrival(s): 15:55 Start Time: 15:55 End Time: 17:23 Length of Meet: 88 min

21 Names (0 Absent) ☆	15:50	15:55	16:00	16:05	16:10	16:15	16:20	16:25	16:30	16:35	16:40	16:45	16:50	16:55	17:00	17:05	17:10	17:15	17:20	17:23
✓ Labani Bara																				
✓ Dona Sarkar																				
✓ Subhojit Ray																				
✓ Laboni Karmakar																				
✓ Rahul Debnath																				
✓ Utsa Biswas																				
✓ Sumana Sarmin																				
✓ Kuheli Biswas																				
✓ Swagata Mondal																				
✓ Pramita Chakraborty																				
✓ Mrinmayee Biswas																				
✓ Anindita Malakar																				
✓ Ripan Pal																				
✓ Susmita Biswas																				
✓ Arpita Bhowmick																				
✓ Sugata Biswas																				
✓ Somnath Ghosh																				
✓ Anirban Sarkar																				
✓ Md Shorif Biswas																				
✓ Sharmistha Mondal																				
✓ Sakil Shaikh																				

Daily Attendance Legend:

The student was present then exited rejoined and rejoined again etc etc (the alternating background patterns indicate that the student may have left and rejoined the Meet)
The student missed the entire class

Total Present: 21

Valedictory Session

In Dr. Joydeb Bhattacharyya started addressing the session followed by Iftikar Rahaman and Sri Bipul Sarkar. The facilitators expressed their opinion that the online certificate course was important for developing knowledge-based education skills. Dr. Joydeb Bhattacharyya expressed optimism to introduce more inter-disciplinary certificate courses in collaboration with the other departments of the college.

Sri Bipul Sarkar and Iftikar Rahaman thanked all the participants for their active participation and requested the participants to apply knowledge and skills gained from the training in real field problems.

The participants were asked to give online feedback.

Attendance at the valedictory session*:

(The attendance of JB is not recorded as a host of the session)

Daily Attendance Report for Population Dynamics2020: 2020-10-10[Show Attendance Summary](#)

Class: Population Dynamics2020

Meet ID: jbm-ckce-wdr

Date: 2020-10-10

Earliest Arrival(s): 16:03

Start Time: 16:03

End Time: 17:08

Length of Meet: 65 min

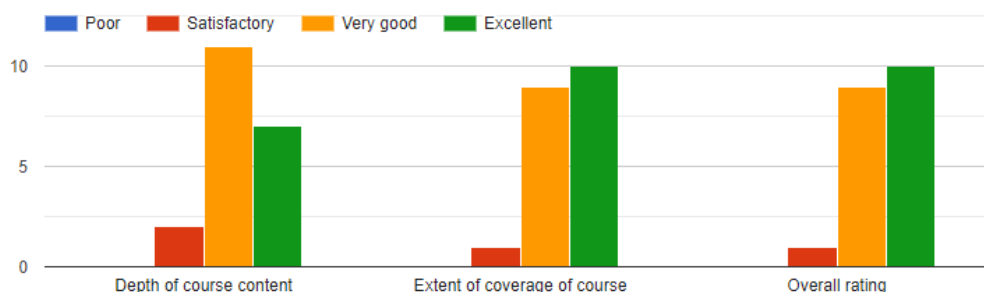
24 Names (5 Absent) ★	Arr	min	Last	16:00	16:03	16:05	16:10	16:15	16:20	16:25	16:30	16:35	16:40	16:45	16:50	16:55	17:00	17:05	17:08
✓ Anindita Malakar **	16:03	39	16:41																
✓ Anirban Sarkar **	16:05	37	16:41																
✓ Arpita Bhowmick **																			
✓ Bipul Sarkar **	16:10	58	17:07																
✓ Dona Sarkar **	16:20	22	16:41																
✓ Ifthikar Rahaman **	16:03	60	17:02																
✓ Kuheli Biswas **	16:03	23	16:28																
✓ Labani Barai **	16:03	39	16:41																
✓ Laboni Karmakar **	16:03	39	16:41																
✓ Md Shorif Biswas **	16:03	33	16:41																
✓ Minmayee Biswas **	16:09	30	16:41																
✓ Pramita Chakraborty **	16:03	39	16:41																
✓ Rahul Debnath **	16:03	39	16:41																
✓ Ripan Pal **	16:03	27	16:29																
✓ Sakil Shaikh **	16:04	35	16:38																
✓ Sharmistha Mondal **																			
✓ Somnath Ghosh **	16:03	23	16:28																
✓ Subhojit Ray **																			
✓ Sugata Biswas **	16:03	34	16:41																
✓ Sumana Sarmin **																			
✓ Sumita Biswas **	16:03	30	16:41																
✓ Sutrisna Mandal **																			
✓ Swagata Mondal **	16:03	23	16:41																
✓ Utsa Biswas **	16:06	10	16:28																
24 Names (5 Absent) ★	Arr	min	Last	16:00	16:03	16:05	16:10	16:15	16:20	16:25	16:30	16:35	16:40	16:45	16:50	16:55	17:00	17:05	17:08

Screenshots of the valedictory meeting:

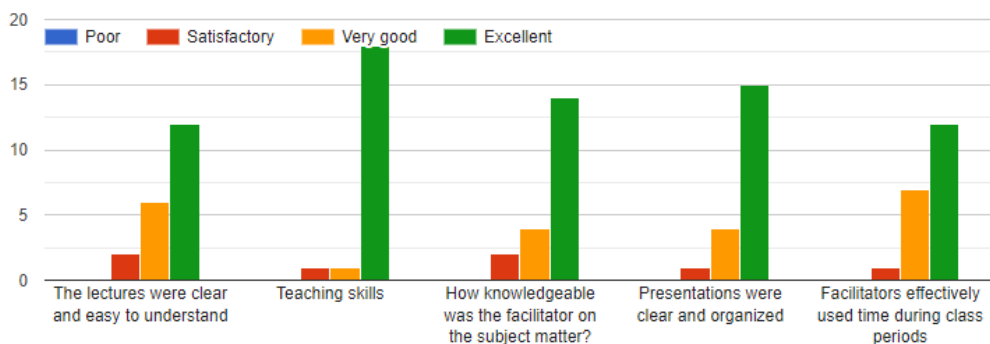
Participants Feedback

Timestamp	Email Address	Were objectives of the course clear to you?	The course increased my knowledge of the subject matter	Depth of course content	Extent of coverage of course	Overall rating	The lectures were clear and easy to understand	Teaching skills	How knowledgeable was the facilitator on the subject matter?	Presentations were clear and organized	Facilitators effectively used time during class periods
10-10-2020 16:24:20	donasarkar2002@gmail.com	Yes	Yes	Very good	Very good	Very good	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory
10-10-2020 16:26:34	minmayeebiswas330@gmail.com	Yes	Yes	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
10-10-2020 16:29:27	susmitabiswas23591@gmail.com	Yes	Yes	Very good	Very good	Very good	Excellent	Excellent	Excellent	Excellent	Excellent
10-10-2020 16:30:14	biswasshorif786@gmail.com	Yes	Yes	Very good	Very good	Very good	Very good	Excellent	Excellent	Excellent	Very good
10-10-2020 16:31:30	shaikhsakil450@gmail.com	Yes	Yes	Very good	Excellent	Very good	Very good	Excellent	Excellent	Excellent	Very good
10-10-2020 16:40:30	ripanpal1234@gmail.com	Yes	Yes	Very good	Satisfactory	Satisfactory	Excellent	Excellent	Very good	Excellent	Very good
10-10-2020 16:41:04	pramitadaisy@gmail.com	Yes	Yes	Satisfactory	Very good	Very good	Very good	Excellent	Excellent	Very good	Excellent
10-10-2020 16:41:24	aninditamalakkar2001@gmail.com	Yes	Yes	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
10-10-2020 16:47:21	labonikarmakar2000sss@gmail.com	Yes	Yes	Excellent	Very good	Excellent	Excellent	Excellent	Excellent	Excellent	Very good
10-10-2020 16:52:10	pijushshil349@gmail.com	Yes	Yes	Very good	Very good	Very good	Very good	Excellent	Very good	Very good	Very good
10-10-2020 16:59:32	Swagata057@gmail.com	Yes	Yes	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
10-10-2020 17:11:19	anirbansarkar9977@gmail.com	Yes	Yes	Very good	Very good	Very good	Very good	Excellent	Excellent	Very good	Excellent
10-10-2020 17:16:39	rockyval21092000@gmail.com	Yes	Yes	Very good	Excellent	Excellent	Very good	Excellent	Very good	Very good	Excellent
10-10-2020 17:23:34	sugataab66@gmail.com	Yes	Yes	Very good	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
10-10-2020 18:10:50	rumibiswas486@gmail.com	Yes	Yes	Very good	Very good	Very good	Excellent	Excellent	Excellent	Excellent	Excellent
10-10-2020 18:20:19	labani2000b@gmail.com	Yes	Yes	Very good	Excellent	Very good	Excellent	Excellent	Very good	Excellent	Excellent
10-10-2020 19:00:11	smj8@datamail.in	Yes	Yes	Satisfactory	Very good	Excellent	Satisfactory	Very good	Satisfactory	Excellent	Very good
10-10-2020 20:31:19	subhojitray06@gmail.com	Yes	Yes	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
10-10-2020 20:35:33	sg6657202@gmail.com	Yes	Yes	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
10-10-2020 22:23:03	utsabiswas599@gmail.com	Yes	Yes	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Very good

Course Content



Teaching Evaluation



What aspects of this course were most useful or valuable?

- Growth curve model
- Before this course I have some knowledge about ecology but now, after taking this course I come to know many things about these courses.
- This is most valuable for me. The content of the class is clear and beautifully organized. Biology and ecosystem are quite interesting.
- Overall course is very useful, from this course we get so much knowledge
- Relation between mathematical model and biology
- There are many guidelines which is very useful and valuable in our biological and mathematical combination course.
- Mathematical part of this course is really good. For which I can learn how can we grow an equation relating many subjects. And also, biological department taught us how every species is interconnected each other for balancing ecosystem, So for this we need to take care of our nature for sustainable future. Last of all, I am thankful to every teacher for this online course 😊.
- Honestly, I loved the quiz part cause it was really fun 😊 and most importantly I couldn't answer them correctly and obviously I love all the information and it's help me to think farther about the mathematical sequence that followed by almost every species....
- Mathematics expressions
- We gathered much knowledge. So, thanks all the sir.
- আমার পপুলেশন সম্পর্কে খুবই কম বিষয় জানা ছিল এই course টা করার পর আরও অনেক কিছু জানতে পারলাম। অঙ্কের সাথে বায়োলজির যে সম্পর্ক আছে সেটা আমার জানা ছিল না যা জানলাম এই course টা করার পর।
- Overall course is valuable, from this we gained our knowledge
- Before this course I have some knowledge about ecology but now, after talking the courses I come to know everything is about this course.

How would you improve this course?

- It can never be better
- Sound quality sometime going poor. Overall, the course is excellent. Next time we want more this type of knowledgeable course.
- With adding more diagram...and provide student some pdf note
- All good
- In my opinion, population dynamics is an excellent course. There are most valuation of this course in our environmental life and educational life. So, I like the course.
- I think it was good, but if every student presents a small presentation about a particular topic of entire course which he/she learnt better. Then students also feel how to present a presentation, and for this interaction between teachers and students becomes improve 😊😊.
- I have no complaints about the course it was almost perfect in every aspect.
- To knew known.
- প্রতি ক্লাসের শেষে যে quiz নেওয়া হতো তাতে প্রশ্নের সংখ্যা বেশি থাকলে খুব ভালো হতো। In future যদি বিভিন্ন
- Everything is okay.

Students Feedback analysis:

The feedback data (via google form) is analyzed and their suggestions are considered and placed before an online meeting for possible incorporation in the curriculum. The online feedback analysis revealed that more than 95% of the participants are very much satisfied with this course outcome, flexibility on curriculum, quality of teaching-learning process offered in this certificate course.

The feedbacks were collected and collated by the facilitators of the certificate course and important suggestions/ideas given by the students for enhancing the curriculum were shortlisted.

The most common points raised by the students were:

- Sound quality issues during some of the google meet sessions.
- Incorporation of more diagrammatic representation during classes.
- Providing lecture notes after the classes.
- Adding students' presentation session related to the topic.
- Adding more quiz sessions.

Action Taken on Feedback:

After collecting and assessing the feedback from the students on curriculum aspects, the valuable suggestions were deliberated in an online meeting on 10th Oct 2020. It has been decided in the meeting that all these points raised by the students will be taken care of in the forthcoming certificate courses.

Sl. No.	Feedback	Action Taken
1	Sound quality issues during some of the google meet sessions.	The host will use a broadband connection with bandwidth > 50 Mbps to minimize the audio and video quality issues.
2	Incorporation of more diagrammatic representation during classes.	An online platform 'Renderforest' (or an equivalent) will be used to create high-quality explainer videos.
3	Providing lecture notes after the classes.	Lecture notes and transcripts of each session will be shared with the participants immediately after a session.
4	Adding students' presentation session related to the topic.	A students' presentation session to be incorporated in the routine.
5	Adding more quiz sessions.	Daily interactive quiz sessions to be included.

Cumulative Score Card

Name of the Applicant	Email Address	Quiz Marks			Attendance	Full Marks	%	Grade
		JB (20)	BS (28)	LR (20)				
Anindita Malakar	aninditamalak2001@gmail.com	5	22	10	5	73	57.53	B
Anirban Sarkar	anirbansarkar9977@gmail.com	18	28	16	5	73	91.78	A+
Antu Mondal	antamondal550@gmail.com	0	0	0	0	73	0.00	F
Arif Mahammad Thandar	arifthandar77@gmail.com	0	0	0	0	73	0.00	F
Arpita Bhowmick	arpita202001@gmail.com	8	24	12	5	73	67.12	B+
BISWAJIT GHOSH	mrbiswajit14nov@gmail.com	0	0	0	0	73	0.00	F
Dona Sarkar	donasarkar2002@gmail.com	5	26	14	5	73	68.49	B+
Kuheli Biswas	rumibiswas486@gmail.com	13	26	12	5	73	76.71	A
Labani Barai	labani2000b@gmail.com	15	28	18	5	73	90.41	A+
Laboni Karmakar	labonikarmakar2000ss@gmail.com	16	24	6	5	73	69.86	B+
Md Mubeen Ghaffari Mandal	mubeenghaffari@gmail.com	0	0	0	0	73	0.00	F
Md Shorif Biswas	biswasshorif786@gmail.com	4	26	4	5	73	53.42	B
Mehedi Hasan Malithya	mehedihasanmalithya387@gmail.com	0	0	0	0	73	0.00	F
Moumita Pal	mitamou3949@gmail.com	2	4	0	0	73	8.22	F
Mrimmayee Biswas	mrimmayeebiswas330@gmail.com	3	26	14	5	73	65.75	B+
Pijush shil	pijushshil349@gmail.com	0	0	0	0	73	0.00	F
Pramita Chakraborty	pramitadaisy@gmail.com	12	26	14	5	73	78.08	A
Rahul Debnath	rockyva121092000@gmail.com	16	26	6	5	73	72.60	A
RAKESH MONDAL	amirakesh2009@gmail.com	0	0	0	0	73	0.00	F
Ripan Pal	ripapal1234@gmail.com	10	18	16	5	73	67.12	B+
Sakil Shaikh	shaikhsakil450@gmail.com	9	28	8	5	73	68.49	B+
Sharmista Mondal	sharmisthamondal0003@gmail.com	4	18	10	5	73	50.68	B
Soma sarkar	sarkarsoma236@gmail.com	0	0	0	0	73	0.00	F
Somnath Ghosh	sg6657202@gmail.com	9	24	6	5	73	60.27	B+
Soumik ghosh	soumikghoshsoumikghosh6@gmail.com	0	0	0	0	73	0.00	F
Sreeja Pramanik	sreejapramanik18@gmail.com	0	0	0	0	73	0.00	F
Subhajit Saha	subhajit2001saha@gmail.com	0	0	0	0	73	0.00	F
Subhojit Ray	subhojitray06@gmail.com	7	24	4	5	73	54.79	B
Subrata pal	subratapal065@gmail.com	0	0	0	0	73	0.00	F
Sugata Biswas.	sugataab66@gmail.com	11	24	10	5	73	68.49	B+
Sujan Biswas	sujanbiswas10122001@gmail.com	0	0	0	0	73	0.00	F
Sumana Sarmin	sarminsumana031@gmail.com	10	20	12	5	73	64.38	B+
Susmita Biswas	susmitabiswas23591@gmail.com	15	24	12	5	73	76.71	A
Sutrisna Mandal	sutrisnamandal307@gmail.com	13	16	12	5	73	63.01	B+
Swagata Mondal	Swagata057@gmail.com	10	28	10	5	73	72.60	A
Swastie Roy	nanditagoswamiroy@gmail.com	0	0	0	0	73	0.00	F
Tapan Mistri	smj8@datamail.in	2	0	0	0	73	2.74	F
Tithi Biswas	biswasitithi227@gmail.com	0	0	0	0	73	0.00	F
Utsa Biswas	utsabiswas599@gmail.com	12	20	8	5	73	61.64	B+
Not an Active Participant								
Grading Scale		Grade						
>=80		A+						
>=70 but <80		A						
>=60 but <70		B+						
>=50 but <60		B						
>=40 but <50		C						
< 40		F						

Certificate Awarded (Sample)

