

DBT STAR COLLEGE SCHEME ANNUAL PROGRESS REPORT (2020 -2021)

DEPARTMENT OF ZOOLOGY

**RAMAKRISHNA MISSION VIVEKANANDA CENTENARY
COLLEGE (AUTONOMOUS), RAHARA, KOLKATA
700118, WEST BENGAL**

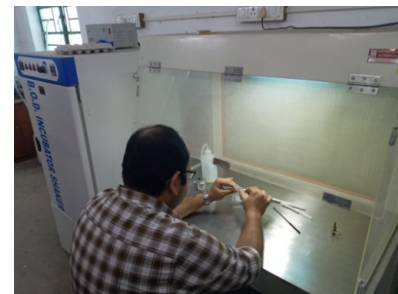
New Practicals introduced (DBT STAR COLLEGE SCHEME)

Date	Topic/Subject	Resource Person	Semester involved	Number of beneficiary	Topic under CBCS courses
06.01.21	PCR demonstration	Dr. Subham Mookerjee & Dr. Suvajit Maity (RKMVC faculty)	V	48	CC XI
21.01.21	DNA isolation	Pryabrta Sinha & Dr. Subham Mookerjee	V	48	CC XI
28.01.01	Media preparation for microbiology study	Pryabrta Sinha & Dr. Subham Mookerjee (RKMVC faculty)	V	48	CC XI
10.02.21	Use of Spectro Photometer for biochemical & molecular study (demonstration)	Dr. Subham Mookerjee & Dr. Suvajit Maity (RKMVC faculty)	III, V	67	CC VII, XI
22.02.21	Use of Horizontal Gel Electrophoresis (online demo class)	Dr. Subham Mookerjee & Dr. Suvajit Maity (RKMVC faculty)	III	41	CC VII
22.01.2021	Gel filtration chromatography (online demo class)	Dr. Suvajit Maity (RKMVC faculty)	III	37	CC VII
23.01.2021	Estimation of SGPT & SGOT (online demonstration)	Dr. Suvajit Maity (RKMVC faculty)	III,	39	CC VII



Equipments procured for new Practicals (DBT STAR COLLEGE SCHEME)

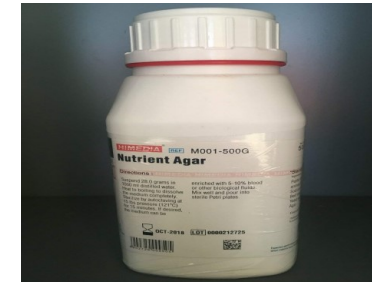
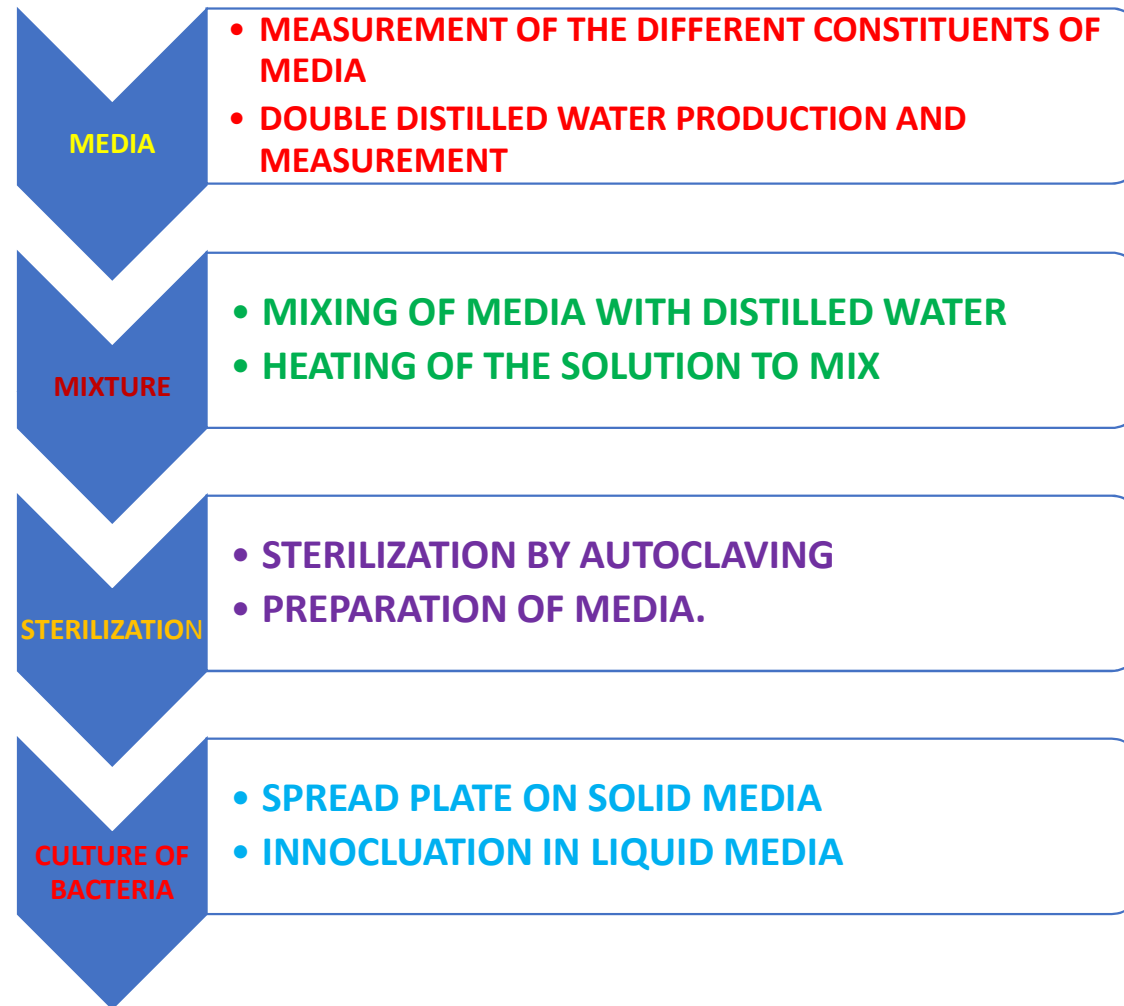
Instruments	Courses	Semester	Status
Microtome WESWOX MT 1090A	CC VI	III	Demonstration of histological tissue sectioning (online)
Vortex mixer DLAB MX-S	CC VII, X, XI, DSE1	III, IV, V	Used during demonstration of PCR (online)
Power supply ORANGE PPS3001	CC VII	III	Used during demonstration of Horizontal Gel Electrophoresis (online)
Magnetic stirrer with hot plate DLAB MS H280 PRO	CC XI	V	Used during buffer preparation & demonstrated its roles (online)
Colony counter LABTRONICS LT37	CC XI	V	Demonstrated the utility during demonstration of practicals related to microbiology (online)
Microscope Olympus i20	CC II, IV, XII	I, II, V	Demonstrated during DSE2 pollination biology (online)
Bacteriological incubator YOMA BIS1212	CC XI	V	Demonstrated the utility during demonstration of practical related to microbiology (online)
Water distillation plant BHANU ES2000 DDQXL-BG	CC VII, X, XI, DSE1	III, IV, V	Used during buffer preparation and PCR demonstration
Micro oven BAJAJ	CC XI	V	Used for gel & media preparation
Horizontal electrophoresis ORANGE G RUN HORIZONTAL	CC VII	III	Demonstrated (online)
Column size exclusion chromatography	CC VII	III	Used for protein separation (online)
Weighing balance METLER	CC II, IV,VII, X, XI, DSE1	I, II, III, IV, V	Used during media & buffer preparation
Digital camera NIKON	CC II, DSE 4	I, VI	Only demonstrated (online)
Magstereo FM24	CC I, DSE 2	I, V	Related to offline Practicals
Computer with accessories	DSE 3	VI	Proposed to use in Bioinformatics classes of 6 th semester
Chemicals & consumables	For all practical course	All semesters	Used in various purposes



Principles/ brief methods & Applications of some of new Practicals introduced (DBT STAR COLLEGE SCHEME)

NEW PRACTICAL	PRINCIPLE/ METHODOLOGY	APPLICATION	NEW INSTRUMENTS USED
MICROBIOLOGICAL MEDIA PREPARATION for culture of Microorganisms	Media constituents are weighed- Double distilled water is added- Heated- Cotton plugging- Autoclaved- poured in Petridish/ Tubes.	Laboratory culture of Microbial organisms- essential for their identification	Weighing Balance, Water distillation plant ,Microwave oven, Autoclave
MICROBIOLOGICAL CULTURE- for growth of bacterial colony	Petridish/ tube with media- Inoculation of sample- Proper spreading/ mixing- Incubation 12-14hrs.	Growth of bacterial colony or liquid culture.	Bacteriological Incubator
DNA ISOLATION	CELL- To make DNA free from protein, proteinase K is added- extraction with phenol and chloroform-DNA is then precipitated by ethanol.	DNA gel electrophoresis for visualization of DNA band, PCR for amplification and sequencing.	Spectrophotometer, Cold centrifuge.
PCR	Preparation of PCR Mix- Addition of Primers- Addition of Template DNA Sample- Thermal cycling- Amplified PCR Product	DNA amplification	Vortex Mixer, Thermal cyclcr.
Horizontal Gel Electrophoresis	Preparation of Agarose Gel- Loading of PCR product- Electrophoresis- Analysis of results by UV Transilluminator	Analysis of PCR product- by the DNA bands analysis.	Horizontal Electrophoresis System, Power Supply system.

Brief Protocol of MICROBIOLOGICAL MEDIA PREPARATION (GENERAL)& MICROBIAL CULTURE (DBT STAR COLLEGE SCHEME)

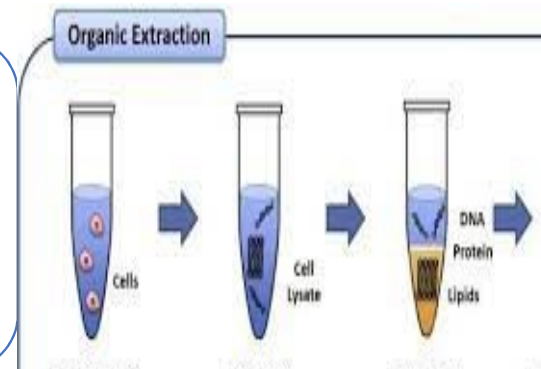


BACTERIAL GROWTH

Brief Protocol of DNA ISOLATION, PCR & HORIZONTAL GEL ELECTROPHORESIS (DBT STAR COLLEGE SCHEME)

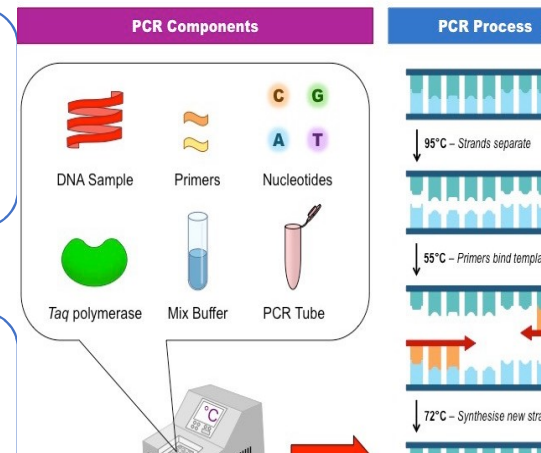
DNA ISOLATION

- LYSIS OF CELL BY SDS AND PROTEINASE K
- ADDITION OF PHENOL- CHLOROFORM- ISOAMYL ALCOHOL FOR SEPERATION OF DNA FROM CELLULAR DEBRIS
- SEPARATION BY CENTRIFUGATION
- CONCENTRATION AND PURIFICATION BY ETHANOL



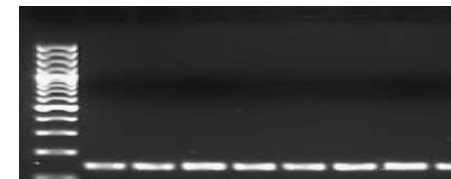
PCR

- PCR MIXTURE IS PREPARED.
- PRIMERS ARE ADDED
- TEMPLATE DNA IS ADDED
- THERMAL CYCLING PERFORMED



HORIZONTAL GEL ELECTROPHORESIS

- AGAROSE GEL IS PREPARED.
- PCR PRODUCT IS LOADED IN THE AGAROSE GEL
- ELECTROPHORESIS IS CONDUCTED
- DNA BANDS ARE ANALYSED UNDER UV LIGHT.



Brief Principles of Gel filtration chromatography, SGPT, SGOT (DBT STAR COLLEGE SCHEME)

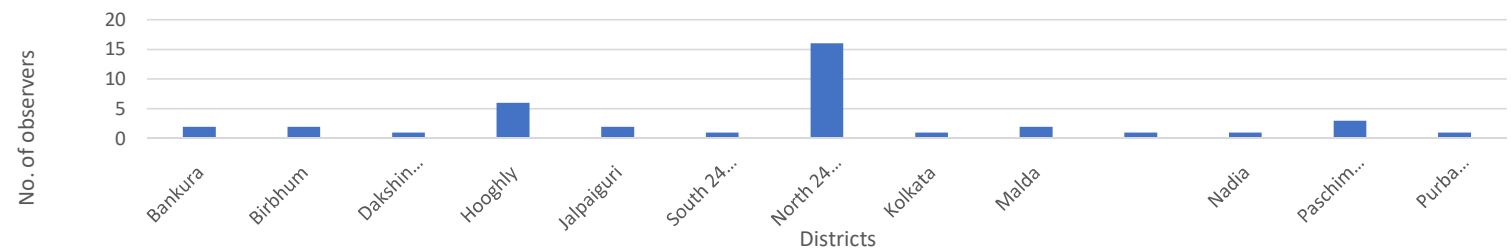
- The **Gel filtration chromatography** is based on the molecular size and the hydrodynamic volume of the components.
- The molecules are separated by the differential exclusion or inclusion of solutes as they pass through the stationary phase containing heteroporous cross-linked polymeric gel or beads.
- Gel filtration based on Sephadex enables group separation of biomolecules that are above the exclusion limit of the medium, from contaminants such as salts, dyes, and radioactive labels. Sephadex is prepared by cross-linking dextran with epichlorohydrin.

- **SGOT (AST)** catalyzes the transfer of amino group between L-aspartate and α -ketoglutarate to form oxaloacetate and glutamate.
- The oxaloacetate formed reacts with NADH in the presence of Malate Dehydrogenase to form NAD. The rate of oxidation of NADH to NAD is measured as a decrease in absorbance which is proportional to the SGOT (AST) activity in the sample. It is a liver toxicity marker enzyme.
- REACTION: L- Aspartate + α -Ketoglutarate - Oxaloacetate + L-Glutamate
- Oxaloacetate + NADH - L-Malate + NAD

- Similarly, **SGPT (ALT)** catalyzes the transfer of amino group between L-Alanine and α -ketoglutarate to form pyruvate and glutamate.
- The pyruvate formed reacts with NADH in the presence of Lactate Dehydrogenase to form NAD. The rate of oxidation of NADH to NAD is measured as a decrease in absorbance which is proportional to the SGPT (ALT) activity in the sample. It is a liver toxicity marker enzyme.

Interdisciplinary/interdepartmental projects (DBT STAR COLLEGE SCHEME)

- **Title:** Diversity & distribution of avian neighbours with special reference to habitat structures of urban, semi urban or rural areas West Bengal
- **Semester involved:** UG Semester I
- **Number of beneficiary:** 39
- **Project methodology includes:** sampling design and standardization; design of the map (by using **GIS**) of study site; measurements of ecological parameters; different diversity indices calculation; abundance modelling by using rank abundance curves; identify and characterization of habitat preferences of birds; **statistical analysis**; design of probable conservation strategies (if required)
- **Sampling period:** 21st October - 31st December 2020; early Morning & Afternoon (34 sampling each from early morning & afternoon sessions were done from observation points of each sampling sites)
- **Supervisor :** Dr. Arunava Mukherjee (RKMVC faculty)
- **Present Status:** every student has submitted their individual project report and data. Cumulative and comparative data compilation and analysis is now going on.

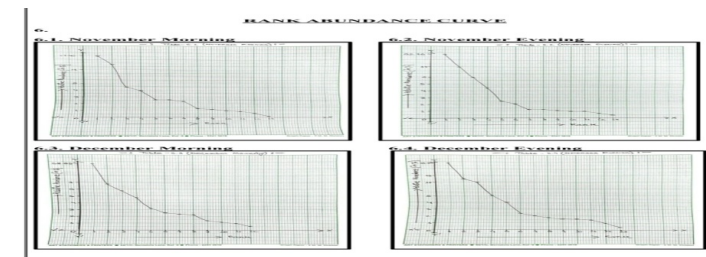
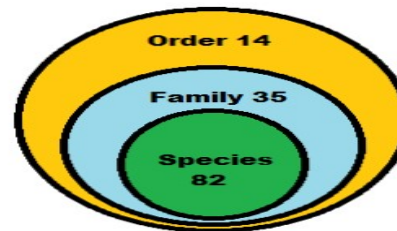
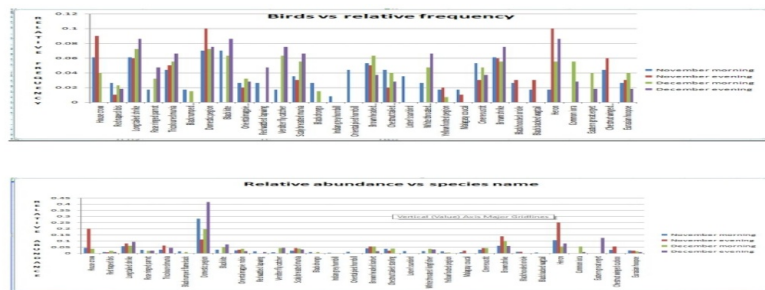
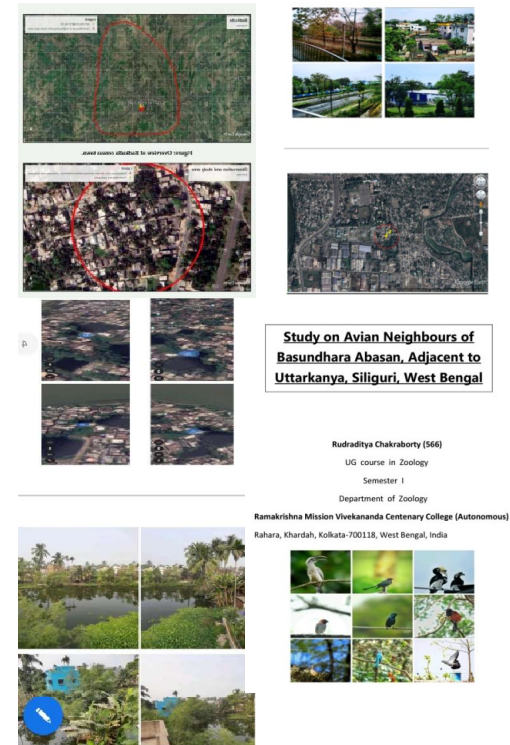


DISTRICT	SUB DIVISION	CODE OF STUDY SITE	SPECIES	MOST ABUNDANT
Nadia	Ranaghat - I	504KM	25	Indian crow
North 24 Parganas	Barrackpore	505AD	9	Indian crow
Birbhum	Rampurhat	506RB	20	Rock pigeon
Malda	Maldah	509NP	10	Common Myna
Murshidabad	Kandi	510DB	15	Jungle babbler
Paschim Burdwan	Asansol sadar	512AD	14	Rock pigeon/ cattle egret
Bankura	Bishnupur	513DG	19	Jungle babbler
Purba Bardhaman	SDO Sadar North	515AS	10	Rock pigeon
North 24 Parganas	Barrackpore	517SG	18	Barn swallow/ common crow
North 24 Parganas	Barasat	519SM	16	Rock pigeon
Birbhum	Rampurhat	520DM	12	Indian crow
Hooghly	Serampore	522KM (TB)	18	Rock pigeon
Hooghly	Arambagh	523RG	11	Rock pigeon
South 24 Parganas	Behala	524SC	6	Indian crow
Malda	Malda Sadar	526AD	12	Indian crow
North 24 Parganas	Dumdum	531AD	16	Indian crow
Hooghly	Sadar	533AD	31	Indian Pond Heron
North 24 Parganas	Barrackpur	535KD	15	Indian crow
Kolkata	Naktala	539SD	10	pigeon/ crow/ sparrow
North 24 Paraganas	Rahara	541SA	13	black kite
North 24 Paraganas	Barrackpore	543MM	30	Indian crow
Hooghly	Shrirampur	544PD	12	Common Myna
North 24 Paraganas	Barrackpore	546DD	15	Indian crow
North 24 Paraganas	Barrackpore	547TC	9	Indian crow
North 24 Paraganas	Barrackpore	548DG	14	Indian crow
North 24 Paraganas	Khardah	551RG	19	Rock pigeon/OMR/ Dove
Paschim Bardhaman	Asansol Sadar	553AR	14	Rock pigeon
Dakshin Dinajpur	Balurghat	554SG	16	Indian crow
North 24 Paraganas	Barasat	557RM	11	Black Drongo
Jalpaiguri	Jalpaiguri	558AM	10	NA
North 24 Paraganas	Barasat	560PR	10	Indian crow
Hooghly	Arambagh	562DC	18	Indian crow
Paschim Bardhaman	Durgapur	564AC	15	Rock pigeon
Bankura	Bishnupur	565AG	14	Rock pigeon
Jalpaiguri	Jalpaiguri	566RC	30	Rock pigeon
North 24 Paraganas	Khardah	567JC	8	Indian crow
North 24 Paraganas	Barrackpore	568AM	15	Indian crow
North 24 Paraganas	Barasat	569DR	16	Jungle babbler
Hooghly	Chinsurah	5661AM	26	Crow/ pigeon/ jungle babbler

Interdisciplinary/interdepartmental projects (DBT STAR COLLEGE SCHEME)

Primary results (few):

- *Number of districts (where sampling had done) : 13
- *Total number of taxa (species) observed & counted : 82 (under 35 Taxonomic Families & 14 Taxonomic Orders)
- *Number of habitat perch observed: 2832
- *Map of each sampling sites were designed
- *Relative Abundances, Relative Densities & Relative Frequencies were estimated
- *Rank abundance curves were generated (geometric and broken stick models were found in most cases)
- *Biodiversity indices such as Shannon Weiner, Simpson's 1/D, Evenness J were calculated
- *Bird's preferred perching habitats were documented from each sampling sites.
- *Comparative analysis among various sampling sites & statistical analysis related to habitat preferences of observed birds are now going on.



Workshops and Seminar organized (DBT STAR COLLEGE SCHEME)

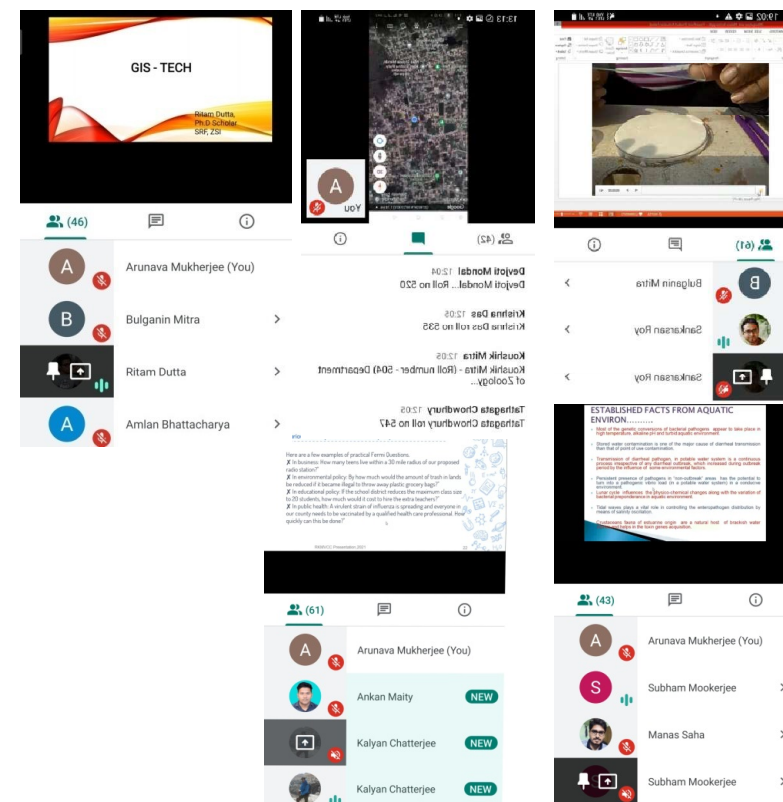
Workshops arranged by department

Date	Topic/Subject	Resource Person	Semester involved	Number of beneficiary
11.02.21	Basic field approach for pollination studies	Dr. Udipta Chkrabrtty (University of Kalyani)	V	22
15.02.21	Mapping & GIS system	Sumit Dey (ZSI)	I	44
18.02.21	Pollen basket & stinger isolation from honey bee; Mouth parts dissection & identification of mosquitoes	Sankarsan Ray (District Entomologist, Government of West Bengal)	I	51

Interdepartmental workshop

Date	Topic /Subject	Resource Person	Departments involved	Number of beneficiary (both students & faculties)
07.04.2021	Environmental Water Sources & Diarrhoea	Dr. Subham Mookerjee (Department of Zoology, RKMVC College Rahara)	Physics, Chemistry, Mathematics, Botany & Zoology	10 students & 2 faculties from each department. Total 60 people

Students of all semesters also have participated in Webinars organized by National Agri-Food Biotechnology Institute (NABI)



Faculty improvement programs (DBT STAR COLLEGE SCHEME)

Date	Programs	Department	Number of Participants
02.08.2020	How to use TCSion platform for Digital Classroom	All departments	60
16.10.2020	Use of CISCO WEBEX platform	All departments	60

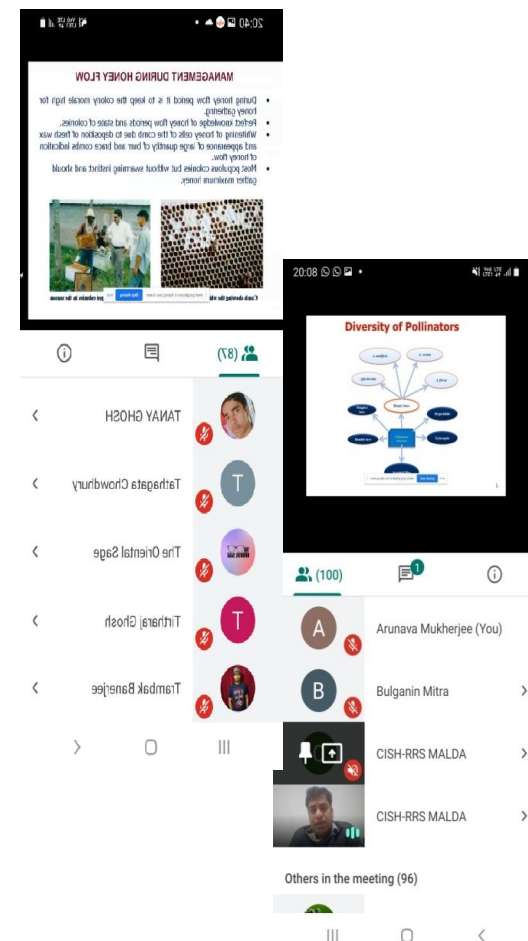
Visits to industry and important labs of national eminence (DBT STAR COLLEGE SCHEME)

- Visited to ICAR Central Institute of Subtropical Horticulture at Malda, West Bengal (27 -28 th February, 2021)
- Number of students visited = 2
- Number of faculty visited = 2
- Outcome of visit:
 1. understanding of techniques related to apiculture
 2. Purification of honey and bee wax
 3. Pollinators & their roles in horticulture



Lectures Delivered by Experts/Speakers in relevant subject area (DBT STAR COLLEGE SCHEME)

Date	Topic /Subject	Resource Person	Semester involved	Number of beneficiary
20.02.21	Beekeeping, managed pollination protocols & quality honey production	Dr. Dipak Nayek (Senior Scientist CISH- ICAR)	I, III, V	➤ 100
25.02.21	Identification & preservation of museum specimens	Dr. Bulganin Mitra (Emeritus Professor of Zoology dep. of RKMVC, Former scientists ZSI)	I, V,	66
08.01.2021	Webinar on “Protein folding and interactions”	Prof. Pinakpani Chakrabarti, Senior Prof and J.C. Bose Fellow, Department of Biochemistry, Bose Institute	I, III, V	78
11.12.2020	Webinar on Bacterial warfare mediated by Type VI Secretion system	Biswanath Jana, Department of Clinical Microbiology and Immunology, Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel.	I, III, V	39
08.12.2020	Webinar on ‘Awesome geographical sweep of a mutant coronavirus, with some hesitations.’	Prof. Partha P Majumder, Former Director, NIBMG, Kalyani and President, Indian Academy of Science	I, III, V	>100
05.12.2020	Webinar on ‘Understanding the social language of bacteria: Speak or not to speak?’	Dr. Subhadeep Chatterjee, Scientist, Centre for DNA Fingerprinting & Diagnostics, Hyderabad-500039, Telengana (Bhatnagar Awardee-202	I, III, V	82
29.09.2020	Induction Programme For the Newly admitted students of Zoology of the college	Prof. Arun Bandyopadhyay, Director, Indian Institute of Chemical Biology (IICB)	I	60
03.07.2020	Webinar on Biophysics of protein folding aggregation in Neurodegenerative diseases	Dr. Sumanta Ghosh, Postdoctoral Research Fellow, University of Texas, USA	IV, VI	53
03.07.2020	Webinar on Molecular Detection of Diabetes Mellitus from Exhaled Breath Analysis	Dr. Chiranjit Ghosh, Post-doctorate Research Fellow, Division of Infectious Disease, Harvard Medical School/BWH, Harvard University	IV, VI	49



Outreach activities (DBT STAR COLLEGE SCHEME)

Date	Topic	Resource person	Institution	Number of Participants
31.03.2020	Mission Antarctic: Indian Research on Faunal Diversity	Dr. Bulganin Mitra (Emeritus Professor of Zoology dep. of RKMVC Rahara)	Serampore College, Jogesh Chandra Chaudhury College	50
09.04.2021	Why we need to know ecology?	Dr. Arunava Mukherjee (Department of Zoology, RKMVC Rahara)	Government Sponsored Multipurpose School for Boys Taki House	41

Webinar on
MISSION ANTARCTIC: Indian Research on Faunal Diversity
DBT STAR COLLEGE SCHEME
Department of Zoology
Ramakrishna Mission Vivekananda Centenary College
Rahara, Kolkata

Speaker
DR. BULGANIN MITRA
Emeritus Professor
Department of Zoology
Ramakrishna Mission Vivekananda Centenary College

+91700XXXXXXX
+91983XXXXXXX
+91983XXXXXXX
(only UG students)
Registration will be open from March 2021
<https://docs.google.com/forms/d/1K.../edit>

One-Day Science Outreach Programme

Organized By
Ramakrishna Mission Vivekananda Centenary College



Under
DBT-STAR College Scheme

In-association with
Govt Sponsored Multipurpose School for Boys' Taki House



Programme Schedule

Date: 9th April 2021 (Friday)
Platform: Google Meet
Joining at the Meet: 10:40-10:50 AM

Inaugural Address	Principal, RKMVC College	10:50 – 11:00 AM
Lecture 1 Subject: Zoology Title: Why We Need To Know Ecology	Dr Arunava Mukherjee	Talk: 11:00-11:30 AM Students' interaction: 11:30-11:35 AM
Lecture 2 Subject: Chemistry Title: History of Coordination Chemistry	Dr Sougata Sarkar	Talk: 11:40-12:10 PM Students' interaction: 12:10-12:15 PM
Lecture 3 Subject: Physics Title: Origami and Modern Science	Dr Kalyan Brata Chatterjee	Talk: 12:20-12:50 PM Students' interaction: 12:50-12:55 PM
Lecture 4 Subject: Botany Title: Light and Life: The Indispensable Process of Photosynthesis	Dr Avik Kumar Choudhury	Talk: 1:00-1:30 PM Students' interaction: 1:30-1:35 PM
Concluding Remarks		

Training of Lab Manpower (DBT STAR COLLEGE SCHEME)

Date	Topic	Resource person	Number of Participants
16.12.2020	Buffer preparation	Dr. Suvajit Maity Dr. Arunava Mukherjee	1
16.12.2020	Use of Water distillation plant	Dr. Subham Mookerjee	1
16.12.2020	Use of Autoclave	Samir Sardar	1



Impact of STAR COLLEGE SCHEME (DBT STAR COLLEGE SCHEME)

Year	Number of students appeared in final semester (6 th semester)	Number of students pursued / pursuing MSc / Integrated PhD
2020	41	30
2019	33	16
2018	35	17

Examination	Number of successful students	Highest rank in 2020
JAM	5	5 th
JGEEBILS	1	-
GAT B	3	27 th
CUCET	10	-

Publication of research articles:

BAGCHI, A., BISWAS, S., DAS, S., BISWAS, R., SHA, R. C., & MAHATO, L. (2020). CONFIRMATION OF RAGADIA CRISILDA (HEWITSON 1862) AND MATAPA CRESTA (EVANS 1949) IN WEST BENGAL, INDIA. BIONOTES , 236-237.

SHIL, D., BAGCHI, A., SARKAR, P., MITRA, B., MANDAL, B., SARDAR, S., MUKHERJEE, A. (2021). FIRST REPORT OF Geocoris (GEOCORIS) lituratus (FIEBER, 1844) (GEOCORIDAE: HEMIPTERA) AS EGG PREDATOR OF *Graphium agamemnon* (LINNAEUS, 1758) (PAPILIONIDAE: LEPIDOPTERA) IN URBAN LANDSCAPE, WEST BENGAL. AMBIENT SCIENCE . (COMMUNICATED)

Students qualified/selected for pursuing Post Graduation / Integrated PhD

Indian Institute of Sciences (IISC, Bangalore)
Tata Institutes of Fundamental Research (TIFR, Mumbai)
National Institute of Biomedical Genomics (NIBMG, Kolkata)
Department of Biochemistry, University of Calcutta
Department of Biotechnology, Maulana Abul Kalam Azad University of Technology
Department of Animal Biology & Biotechnology, University of Hyderabad
Indian Institute of Technology, Bombay
Department of Marine Biology, Madurai Kamraj University
Debrechen University Hungary
Viswa-Bharati University
West Bengal State University

Budget Expenditure (DBT STAR COLLEGE SCHEME)

Non-recurring

Year 2020-2021	Non recurring	Recurring & consumables
Fund disbursed	10,00,000	3,00,000
Fund utilized	10,27,401	3,06, 420

Recurring (Chemicals, glasswares, books & others)

Chemicals & Glass wares	2,00,000
Books	26852
Others (switches, access points & network accessories)	79568
Total	3,06,420

Instruments with model number	Quantity required	Estimated prices (in quotation)
Microtome WESWOX MT 1090A	1	60900
Vortex mixer DLAB MX-S	1	11800
Power supply ORANGE PPS3001	1	25000
Magnetic stirrer with hot plate DLAB MS H280 PRO	1	20700
Colony counter LABTRONICS LT37	1	7500
Microscope Olympus i20	10	35730 × 10 = 357300
Bacteriological incubator YOMA BIS1212	1	19200
Water distillation plant BHANU ES2000 DDQXL-BG	1	35686
Micro oven BAJAJ	1	7500
Horizontal electrophoresis ORANGE G RUN HORIZONTAL	1	9980
Colounm size exclusion chromatography	1	65625
Weighing balance METLER	1	79500
Digital camera NIKON	1	24900
Magstereo FM24	5	17900 × 5 =89500
Computer desktop	6	1,73,250
Laptop	1	39,060
	Total	10,27,401

Future Activities (DBT STAR COLLEGE SCHEME)

New Practicals

- METHODOLOGY OF ENVIRONMENTAL SAMPLING
- BACTERIAL LOAD DETECTION OF ENVIRONMENTAL SAMPLES.
- BIOCHEMICAL IDENTIFICATION OF THE BACTERIA.
- MOLECULAR DETECTION OF THE BACTERIAL SPECIES USING THE KNOWLEDGE OF DNA ISOLATION, PCR AND HORIZONTAL GEL ELECTROPHORESIS.
- ELISA- BASIC KNOWLEDGE AND USAGE.
- BASIC KNOWLEDGE OF PROTEIN GEL.
- CONSTRUCTION OF LIFE TABLE AND KEY FACTOR ANALYSIS
- STUDY OF WILDLIFE THROUGH PUG MARK ANALYSIS

PROJECT WORK :

- ENVIRONMENTAL MONITORING OF ENTEROPATHOLOGICAL BACTERIAL SPECIES IN LOWER SOUTH BENGAL.

Appropriate modifications will be proposed in curriculum to cover laboratory exposure to students in IPR & Biosafety issues

2 Workshops, 3 seminars, 9 special lectures, 3 outreach programs, lab training & faculty improvement programs will also be organized at regular intervals

**Department of Zoology, Ramakrishna Mission
Vivekananda Centenary College, sincerely
acknowledge the financial helps from DBT,
Government of India under DBT STAR
COLLEGE SCHEME**

THANK YOU