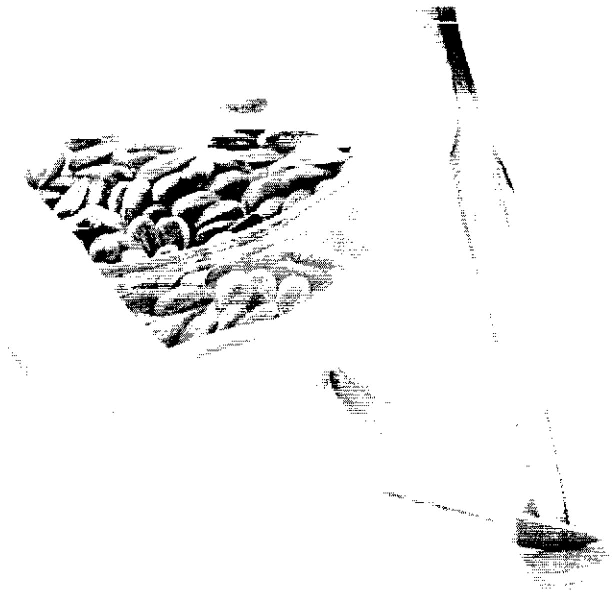


RAMA UNIVERSITY
UTTAR PRADESH
KANPUR

SHORT TERM COURSE ON
PLANT TISSUE CULTURE TECHNIQUES

30 Hours

Begins 17 Aug 2023

INR 2000/-

Ref:RU/FET/BT/BOS/2023/001 **Dated: 03-06-2023**

Faculty of Engineering & Technology
Department of Biotechnology
Minutes of Meeting
Boards of Studies

A meeting of Boards of Studies of Biotechnology (B. Tech.) held on 03-06-2023 in Dean Office. The following members were present:

1. Dr. Ajay Kumar - Chairperson
2. Dr. Manoj Kumar Mishra - Member
3. Dr. Vivek Srivastava - Member
4. Ms. Rati Bajpai - Member (Invited)
6. Ms. Deeksha Ranjan - Member (Invited)
7. Dr. Rajendra Bhadauria - Member (Invited)

The following members agreed to review the minutes in Delhi.

1. Prof.(Dr.) Sanjay Mishra - External Member

Agenda:

1. Action Taken Report (ATR) on the basis of feedback from Stack holder/External member.

The BOS committee confirmed the minutes of the BOS meeting held on 20/05/2022

2. To consider and approve newEvaluation Scheme and Syllabus.

S. No.	Item No.	Existing	Recommendation /Action Taken
1	RU/FET/ UG /BT/BOS/2022	The existing Evaluation Scheme and Syllabus was recommended and approved the proposed introduction of engineering minor electives, pathway electives in existing CBCS based curriculum	To consider and approve the proposed Evaluation Scheme and Syllabus of B. Tech Biotechnology. BOS is recommended to Applied science,

		along with its Evaluation Scheme and Syllabus concurrence with Model Curriculum released by AICTE for B.Tech. for academic session 2022-2023	verbal ability, Reasoning Ability, Capstone project and Industrial training with the same curriculum for academic session 2022-2023. BOS is recommended to Core biotechnology subjects with the revised evaluation scheme and updated syllabus for academic session 2022-2023. BOS is recommended to Core biotechnology subjects with the new codes (BTE) in the revised evaluation scheme and updated syllabus for academic session 2022-2023. BOS is recommended to Core biotechnology subjects with the inclusion of Biostatistics (BTE-303) and Fermentation technology (BTE-505) in the revised evaluation scheme and updated syllabus for academic session 2022-2023. Engineering Minor Elective I subject have been changed with updated content of Nanobiotechnology and Biosensors (TBT-601), Molecular diagnostics and its applications (TBT-602), Food safety and quality management (TBT-603) and Marine Biotechnology(TBT-604). Pathway Elective I subjects have been changed with updated content of Agro biotechnology (BTE-611), Synthetic Biology (BTE-612), Biotechnology for society (BTE-613) and Biomedical Engineering (BTE-614). Engineering Minor Elective II subject have been changed with updated content of Genomics & Genome Engineering (TBT-701), Food Packaging and Storage (TBT-702), Cancer Biology (TBT-703) and Medical biotechnology (TBT-704). Pathway Elective II subjects have been

			changed with updated content of Applications of Natural Products (BTE-711), Pharmaceutical Biotechnology (BTE-712), Biopharmaceuticals (BTE-713) and Bioentrepreurship (BTE-714).

3. **Result Analysis:** All Final year students have 100 % cleared pass their final exam. 93.10 % students of B.Tech IIIrd year was cleared pass the final exam with good marks. 100 % students of B.Tech IInd year was cleared pass the final exam with good marks. All students of B.Tech IInd Year and B.Tech IIIrd has to promote in next semester of the session 2022-23 (Annexure -1).

4. **Feedback Analysis:** Feedback from all B.Tech. Students of session 2022-23 were good for academic and at present available infra of the department.

5. **Short term course:** In coming session 2023-24, we have proposed again short term "Plant Tissue Culture Techniques" as per last session.

The meeting concluded with a vote of thanks to the chair.
Date of the Next Meeting: to be decided and intimated thereafter

(Chairman)

Encl.: Recommended Curricula attached for consideration and approval.

Date of the Next Meeting: to be decided and conveyed later

Chairperson

Signature: .....

Name: Dr. Ajay Kumar

Date:

Internal Members

Signature: 1..... 2.....

Name: Dr. Manoj Kumar Mishra Dr. Vivek Srivastava

External Members

Signature: 1.....

Name: Prof.(Dr.) Sanjay Mishra

Date:

Encl.: Recommended Curricula attached for consideration and approval.

CC:

1. Dean
2. Registrar Office

RAMA UNIVERSITY UTTAR PRADESH, KANPUR

(vide U.P. Act No.1 of 2014 as passed by State Legislature and recognized by UGC U/s-2(f))

Ref. No.: RU/Reg./2023/6094 Date: - 06.07.2023

Office Order

To,

The Dean,
Faculty of Engg. & Technology
Rama University

Dear Sir,

With reference to your submitted proposal dated 26.05.2023. Vice Chancellor has been pleased to accord permission to conduct a short-term certificate course on "PLANT TISSUE CULTURE TECHNIQUES" (as per course ordinance) by the Department of Biotechnology subject to approval of Academic Council.

(Registrar)
Registrar
Rama University
Kanpur (U.P.)

Copy to: -

1. Secretary to Hon'ble Vice-Chancellor.
2. Director Sir
3. Dean Academic Affairs
4. HOD, Department of Biotechnology
5. Controller of Examinations
6. Deputy Registrar/Asst. Registrar
7. Guard File

Department of Biotechnology
Short term Course "Plant Tissue Culture Techniques"
Date 24/08/2023- 09/09-2023

Student submitted fee details

S. No	Students Name	Class	Semester	Fee receipt no.	Amount (Rs.)
1	Aadrsh Singh	B. Tech	III[rd]	Receipt no-2229	2000/-
2	Harshita Singh	M. Sc	III[rd]	Receipt no-2155	2000/-
3	Kashish	M. Sc	III[rd]	Receipt no-1263	2000/-
4	Prince Pandey	B. Sc	V[th]	Receipt no-2183	2000/-
5	Prince Singh	M. Sc	III[rd]	Receipt no-1594	2000/-
6	Richa Shukla	M. Sc	III[rd]	Receipt no-2154	2000/-
7	Sampda Singh	B. Tech	V[th]	UPI transaction id-322853325755	2000/-
8	Sreya Omer	M. Sc	III[rd]	Receipt no-1262	2000/-
9	Srishty Rana	B. Tech	III[rd]	Receipt no- 1188	2000/-
10	Sumaira Khan	M. Sc	III[rd]	Receipt no-2153	2000/-
11	Vikash Kumar Kushwaha	B. Sc	V[th]	SBI Transaction id-T2308232010467547973625	2000/-
12	Yash Ojha	M. Sc	III[rd]	Receipt no-1264	2000/-

Total 24000/-

Dr. Ajay Kumar
HoD Biotechnology

Dr. Manoj Kumar Mishra
Convenor

All 12 transaction are verified
2000 X 12 = 24000/
20/9/23

Prabhat Ranjan

Faculty of Engineering Technology
Department of Biotechnology

Date: 21.08.2023

Short Term course on Plant Tissue Culture Techniques

Date and Time Scheduled

.	Date	Lecture-1 (Conference room)	Lecture-2/Hands on (In LAB)
1	24/08/2023	Introduction about Plant Tissue Culture Conference Room (Manoj Kumar Mishra)	Media Composition and Stock Preparation Conference Room (Manoj Kumar Mishra)
2	25/08/2023	Plant Growth Regulators and Use , (Manoj Kumar Mishra)	Sterilization Procedure and Importance, Conference Room (Samakshi Verma)
3	26/08/2023	Micropropagation (Manoj Kumar Mishra)	Introduction about Plant Tissue Culture LAB and Instrumentation
4	28/09/2023	Somatic Hybridization (Dr. Vibha Pandey)	Recent trends in plant tissue culture techniques (Dr. M.S Shekawat)
5	04/09/2023	Entrepreneurship and skill development in Plant Tissue culture (Dr.Abhishek Awasthi)	Required Chemicals and Salt and storage for PTC LAB
6	05/09/2023	Media Preparation and Autoclaving	Surface sterilization and explants preparation
7	06/09/2023	Hands on plant tissue culture	Plant Inoculation
8	08/09/2023	Plant Hardening and Acclimatization (video lecture)	Plant Inoculation
9	09/09/2023	Assessment test	

Mishra

(Dr. Manoj Kumar Mishra)
Convener

21/8/2023

(Dr. Ajay Kumar)
HoD, Biotechnology

CC: 1. Dean, FET

2. Notice Board

Department of Biotechnology

Short term Course "Plant Tissue Culture Techniques"

Date 24/08/2023- 09/09-2023

Student Attendance Reports

S. No	Students Name	Class	Semester	Attendance Percentage
1	Aadrsh Singh	B. Tech	IIIrd	84%
2	Harshita Singh	M. Sc	IIIrd	98%
3	Kashish	M. Sc	IIIrd	96%
4	Prince Pandey	B. Sc	Vth	94%
5	Prince Singh	M. Sc	IIIrd	98%
6	Richa Shukla	M. Sc	IIIrd	75%
7	Sampda Singh	B. Tech	Vth	82%
8	Sreya Omer	M. Sc	IIIrd	94%
9	Srishty Rana	B. Tech	IIIrd	96%
10	Sumaira Khan	M. Sc	IIIrd	98%
11	Vikash Kumar Kushwaha	B. Sc	Vth	94%
12	Yash Ojha	M. Sc	IIIrd	100%

Dr. Ajay Kumar

HoD Biotechnology

Dr. Manoj Kumar Mishra

Convenor

Department of Biotechnology
Short term Course "Plant Tissue Culture Techniques"
Date 24/08/2023- 09/09-2023

Student Assessment test report

S. No	Students Name	Class	Semester	Total Marks	Marks Obtained
1	Aadrsh Singh	B. Tech	IIIrd	40	31
2	Harshita Singh	M. Sc	IIIrd	40	27
3	Kashish	M. Sc	IIIrd	40	26
4	Prince Pandey	B. Sc	Vth	40	25
5	Prince Singh	M. Sc	IIIrd	40	26
6	Richa Shukla	M. Sc	IIIrd	40	27
7	Sampda Singh	B. Tech	Vth	40	25
8	Sreya Omer	M. Sc	IIIrd	40	32
9	Srishty Rana	B. Tech	IIIrd	40	24
10	Sumaira Khan	M. Sc	IIIrd	40	27
11	Vikash Kumar Kushwaha	B. Sc	Vth	40	25
12	Yash Ojha	M. Sc	IIIrd	40	29

Dr. Ajay Kumar
HoD Biotechnology

Dr. Manoj Kumar Mishra
Convenor

Hands on Training On Plant Tissue Culture Techniques

About the course:

Plant Tissue culture is an important tool for both basic and applied aspects of plant biotechnology as well as its commercial applications. All techniques are skill based and upon systematic learning, can equip a person to effectively utilize the techniques in various areas like basic research, environmental issues and commercial applications. It is a valuable tool for research on crop improvement by biotechnology. Plant Tissue Culture is a practice used to propagate plants under sterile conditions, often used to produce clones of a plant. Different techniques in Plant Tissue culture offer advantages over traditional methods of propagation which includes the production of multiple clones of plants in the absence of seeds or pollinators necessary to produce seeds and mature plants. This course offers a comprehensive hands-on training for learning the basics with an insight to laboratory.

DURATION: 30 HOURS

COURSE FEES: INR 2000

ACCOUNT DETAILS: Account Holder Name: RAMA UNIVERSITY UTTAR PRADESH

Account Number: 696820110000037

Account Type: CURRENT ACCOUNT

IFSC Code: BKID0006968

INSTRUCTORS: Dr. Manoj Kumar Mishra and Dr. Ajay Kumar, Department of Biotechnology, FET, Mob:9305825637, 9412883081; Email: drajay.fet@ramauniversity.ac.in

ELIGIBILITY: Qualification is graduate/post graduate/ Ph.D in biotechnology, biological sciences, agricultural sciences and allied sciences.

COURSEWARE: Course material is provided in printed / electronic form.

MODE: Classroom + Lab.

EVALUATION SYSTEM: Final examination with 100 marks. Score at least 40% to pass.

BATCHES 2023: Batches Start: 17 Aug 2023 to 26 Aug 2023.

(Application start date: 1st Aug 2023-15th Aug 2023), Limited seats are available; registration will be first come first serve bases.

AGE: More than 18 years

EMPLOYMENT OPPORTUNITY:

Plant tissue culture represents the most promising industry at present time and giving an out look into the future. The rapid production of high quality, disease free and uniform planting stock is only possible through plant tissue culture technology out throughout the year irrespective of season and weather. These areas are for micropropagation of ornamental, floriculture crops and forest trees, production of medicinally interesting compounds, and cryopreservation of valuable germplasm for improved nutritional value of major crop plants including tree. New opportunities has been created for producers, farmers and nursery owners for high quality planting materials of fruits, ornamentals, forest tree species and vegetables.

TARGET AUDIENCE

- Students and faculty of Biotechnology/Biological sciences /Botany/Agriculture sciences and other relevant area
- Industry professionals
- Personnel from Academic fields

COURSE CONTENT

Course Content: Course will cover Orientation lectures along with hands-on experience in a variety of plant tissue culture Techniques like

1. Introduction of Plant Tissue culture and requirement for Plant Tissue culture Laboratory
2. Media components and basic calculations and preparation of stock solutions
3. Preparation of various media
4. Explants Preparation and surface sterilization
5. Aseptic transfer of explants
6. Organ culture : meristem culture, root culture, callus culture,
7. Micropropagation
8. Suspension Culture, embryo culture,
9. Somatic embryogenesis , Somaclonal variation
10. Protoplast Isolation and Somatic Hybridization
11. Hardening Techniques
12. Cleaning and Washing techniques
13. Application & Importance of Plant Tissue Culture

COURSE OUTCOME:

The course is intended to share basic tissue culture techniques which include:

1. Principal and application of Tissue culture

2. Preparation of tissue culture media and sterilization process

3. Hands on training for various tissue culture techniques and hardening process

4. Maintenance of cultured plant cell

VALUE ADDED: SEMINAR – (Course Review & Assessment)

CERTIFICATE: Certificate will be provided after completion of course

Short Term course Plant Tissue Culture Techniques

Assessment Exam 2023-24

Name of Student-………………………… **Class……………**

Time: 1hr **Maximum marks: 40**

Note: Attempt all questions. Each question carries 1 mark.

1. Defined Nutrient medium is
   (a) Organic compounds and vitamins (b) only minor or major salts (c) Known constituents and compositions (d) unknown constituents
2. Solubility of IAA hormone is
   (a) HCL (b) KOH (c) only water (d)chlorine
3. Vitrification stage is
   (a) More proliferation stage (b) Physiological malformation (c) Mature stage (d) callus formation in shoot
4. Stage II of Micropropagation is
   (a) Rooting of shoots (b) Proliferation of shoots (c) Acclimatization of plants (d) establishment of culture
5. Explant is
   (a) Shoot Tip, (b) leaf (c) axillary bud (d) all
6. Virus free plants obtained through
   (a) Meristem culture (b) shoot culture (c) Sucker culture (d) Axillary bud culture
7. Surface Sterilization by
   (a) sodium hypochlorite (b) hydrogen peroxide (c) mercuric chloride (d) All
8. Browning of explants due to
   (a) Phenolics leaching (b) water (c) media (d) endogenous infection
9. Antioxidants compounds help in
   (a) Check phenolic exudation (b) ripening of fruits (c) rooting of shoot (d) imitation of shooting
10. Ascorbic Acid is
    (a) Growth Hormone (b) Major salts (c) Antioxidants (d) none
11. Growth Promoting Hormone is
    (a) BAP (b) ABA (c) CH2=CH2 (d) All
12. Gaseous Hormone is
    (a) CH2=CH2 (b) Gibberellin (c) Auxin (d) Cytokinin
13. Auxin > Cytokinin Promotes
    (a) Root (b) Shoot (c) callus (d) embryo
14. Cytokinin > Auxin promotes
    (a) Root (b) Shoot (c) callus (d) somatic embryo
15. Cytokinin ~ Auxin promotes
    (a) Root (b) Shoot (c) callus (d) somatic embryo
16. Essential form of Auxin –
    (a) IAA (b) NAA (c) IBA (d)2-4 D
17. Hormone obtained through fungus
    (a) Auxin (b) Gibberellin (c) Cytokinin (d) ABA
18. Ph of tissue culture media is
    (a) 5.0 (b) 5.8 (c) 5.2 (d) 7.2
19. Agar Agar is obtained through
    (a) Red Algae (b) Blue green algae (c) Green algae (d) None
20. vascular connection present between somatic embryo (Yes/No)

a. Proper nutrients is not available in soil
b. Light temperature shock
c. Risk of desiccation and infection
d. Both b and c

37. Hardening is the stage in which-
(a) In vitro rooting process completes
(b) Aseptically grown tissue culture plants are transferred to the soil
(c) Plants are transferred to the glasshouse for some time and then transplanted to the field
(d) None of these

38. Shoot apical meristem are chosen as explant material because –
(a) They are fast growing tissues
(b) The tissues are located deep inside so that they are themselves virus-free
(c) Easy to handle
(d) Both a and b

39. The preparative stage of micropropagation includes-
(a)Selection of disease-free mother plant
(b)Explant preparation and its surface sterilization
(c)Inoculation of explant
(d)All of the above

40. The major advantage of micro-propagation over macro-propagation are-
(a) Time consuming process
(b)Independent od seasonal variations
(c) Production of disease-free plants
(d) b and c are correct and a is incorrect

21. The process by which an article, surface or medium is made free of undesired microorganisms or spores is called-
Disinfection (b) Antisepsis (c) Sterilization (d) Filtration

22. The Physical methods of sterilization includes-
Heat (b) Radiation (c) Ultrasonic Vibrations (d) All of the above

23. Solubility of BAP hormone is -
(a) KOH (b) Ethanol (c) HCL (d) None of these

24. An autoclave is a most commonly known device used for sterilization, which is based on the principle of- (a) Dry heat sterilization (b) Moist heat sterilization
(c) Physical method of sterilization (d) Both b and c

25. The HEPA filters are-
(a) High Efficiency Particulate arresting (b) High Efficiency Pressure arrestance
(c) Used in Laminar Flow safety cabinets (d) Both a and c

26. The three parameters monitored during autoclaving are-
(a) Temperature, Pressure and Time (b) Pressure, Temperature, and Force
(c) Pressure, Velocity and Time (d) Heat, Time and Pressure

27. Which of the following is used as a chemical sterilizing agent?
(a) 70% alcohol (b) 2% Sodium hypochlorite
(c) Chlorine and hydrogen peroxide (d) All of these

28. Dry heat sterilization includes-
(a) Hot air oven (b) Red heat (c) Flaming (d) All of these

29. Surface sterilization of explants is done by using-
(a) Cetavlon (b) Sodium hypochlorite (c) Isopropyl alcohol (d) All of these

30. The media ingredients such as plant extracts and hormones are thermolabile, they can be sterilized by-
(a) Hot air oven (b) Autoclave (c) Filtration (d) None of these

31. In Plant Tissue Culture, the technique by which rapid multiplication of stock plant material can be done is known as-
(a)Micropropagation (b) Surface Sterilization (c) Callus Culture (d) Organogenesis

32. The term '*Micropropagation*' is so named because, in this technique-
(a) Cultivation of plants can only be done on a small scale.
(b) New plants can be grown by using very small explants or even microscopic cells.
(c) Tiny cells or tissues are used in this method for growing new plants.
(d) Both b and c are correct

33. Recalcitrance is property of some genotypes of plants which shows-
(a) The ability of plant cells, tissues and organs to respond
(b) The inability of plant cells, tissues and organs to respond
(c) Low lignification and impaired stomatal function
(d) a physiological malformation that results in excessive hydration

34. Which types of tissues are considered as 'potential explants' for plant tissue culture?
(a) Parenchyma (b) Collenchyma
(c) Meristematic tissues (d) Sclerenchyma

35. Organogenesis is the formation of individual organ such as shoots or roots, which includes-
(a) Using the explant directly or indirectly where pre-existing meristem is lacking
(b)de-novo origin from the callus
(c) cell culture initiated from the explants
(d) All of these

36. Immediate transfer of aseptically propagated tissue culture plants into the soil is harmful for their survival because of-

DEPARTMENT OF BIOTECHNOLOGY

To, Date: 26.09.2023

The Dean

Rama University, Kanpur

Subject: Regarding incentive of short-term course title "Plant Tissue Culture Techniques.

Sir,

I have successfully conducted a short-term course titled "Plant Tissue Culture Techniques" which was held from 28/08/2023 to 09/09/2023 at the Department of Biotechnology, FET, Rama University. In This programme students submitted total fee **Rs. 24000/-**(Rs 2000 per students). Hence, release the 70 % incentive **(Rs 16800/-)**

I am hereby requesting you to kindly process the incentive of short term course.

(Dr. Manoj Kumar Mishra)

Assistant Professor
Department of Biotechnology
(Convenor)

Forwarded to Dean Sir for n.a

HOD
Biotechnology
FET, Rama University
Kanpur

Ser No. 1695

RAMA UNIVERSITY

www.ramauniversity.ac.in

CERTIFICATE OF SHORT TERM COURSE

This is to certify that

Mr. / Ms. *Sumaira Khan*

has successfully completed more than 30 hours short term course on

" *Plant Tissue Culture Techniques* "

conducted from *24.08.2023* to *09.09.2023* in the department

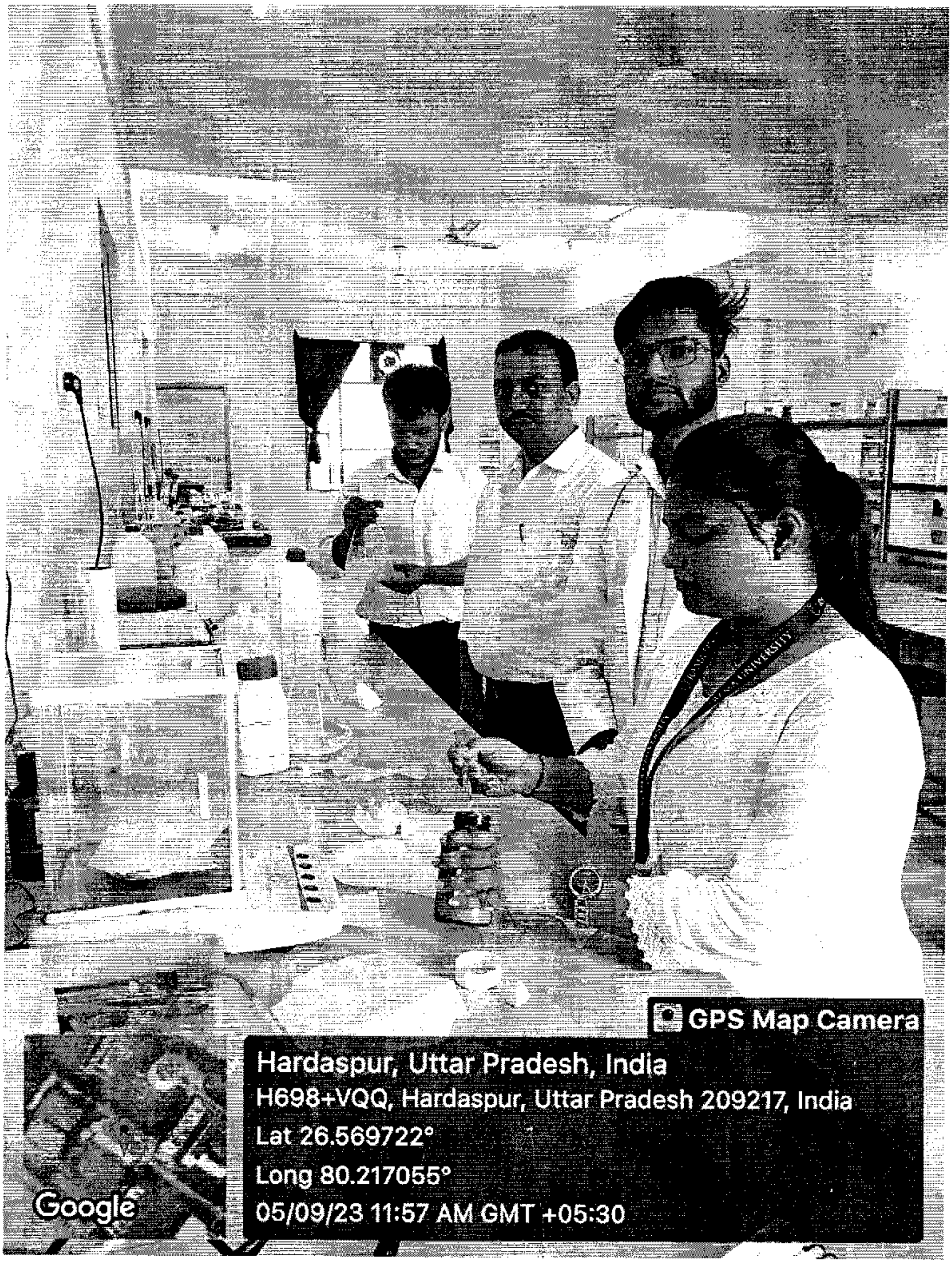
of *Biotechnology* Faculty of *Engineering & Technology*

Dean/Principal

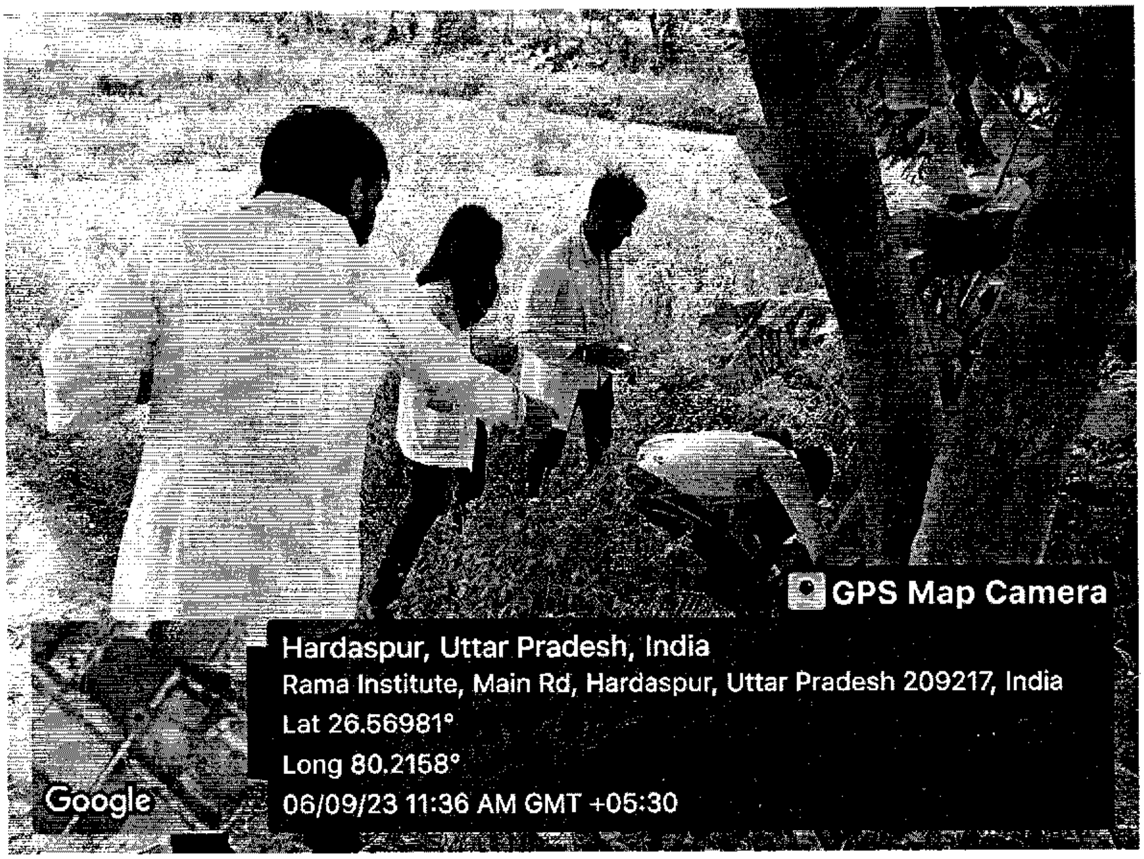
Registrar/Controller of Examinations

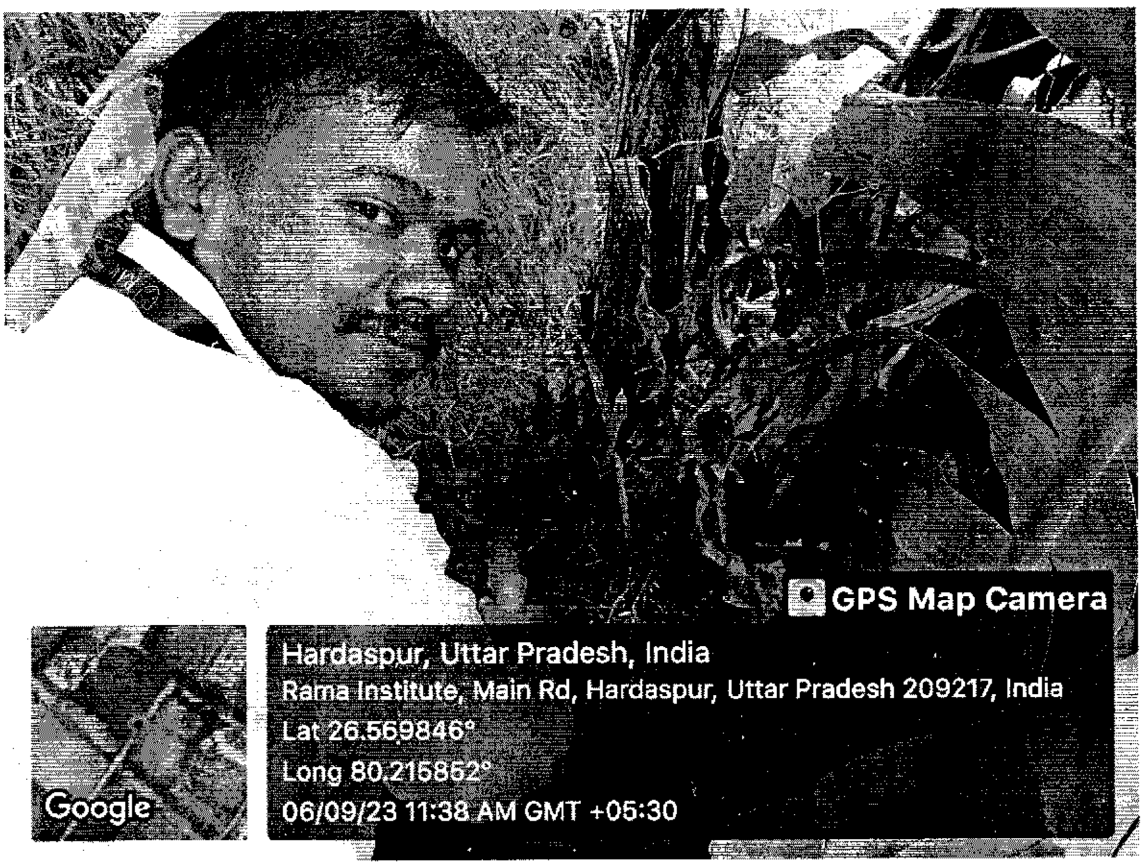
Prabhat
Ranjan

Prabhat Ranjan

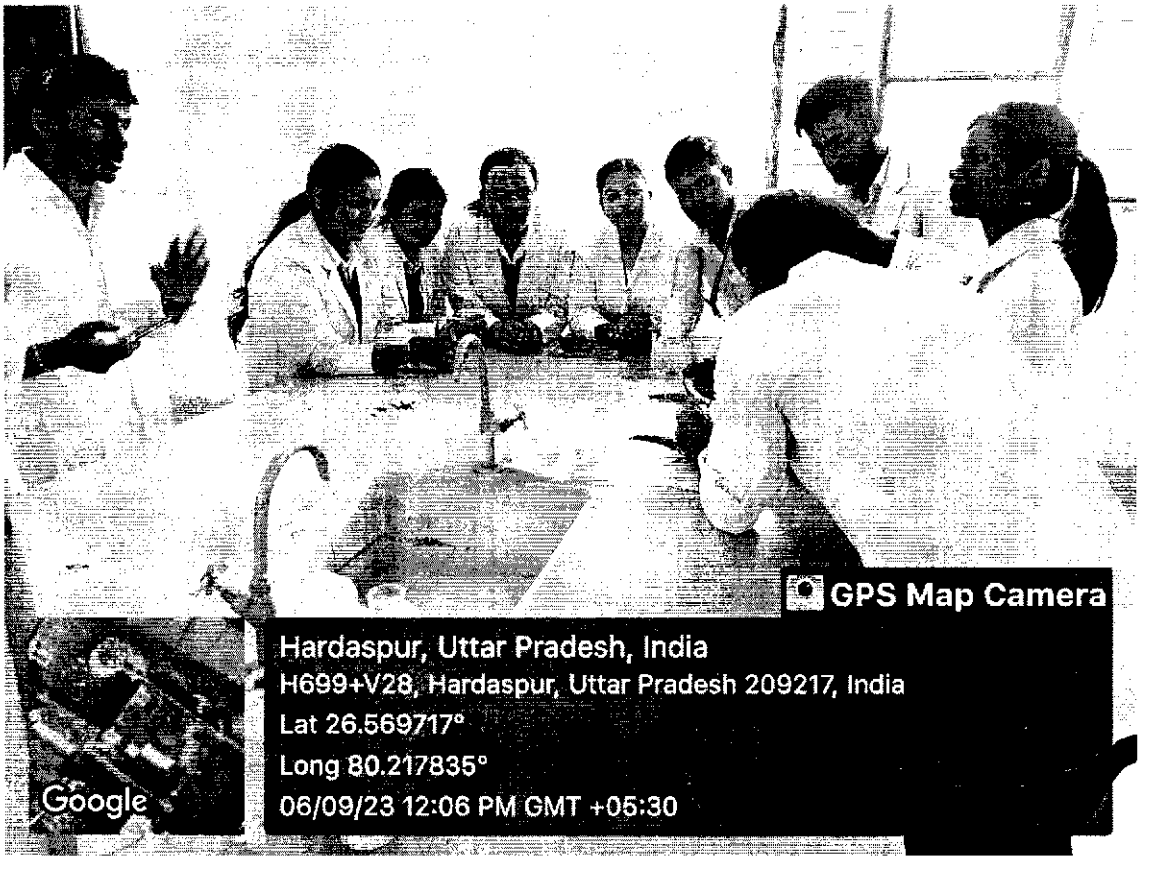


Prabhat Ranjan

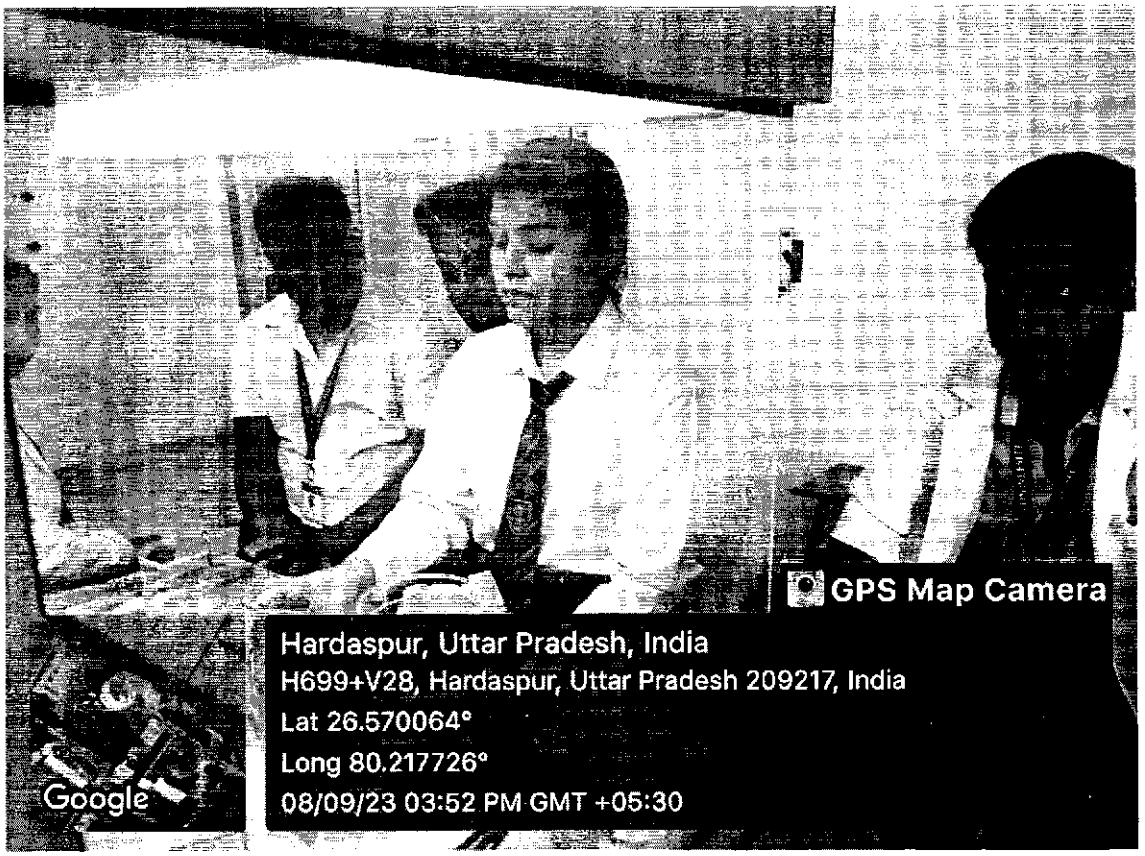




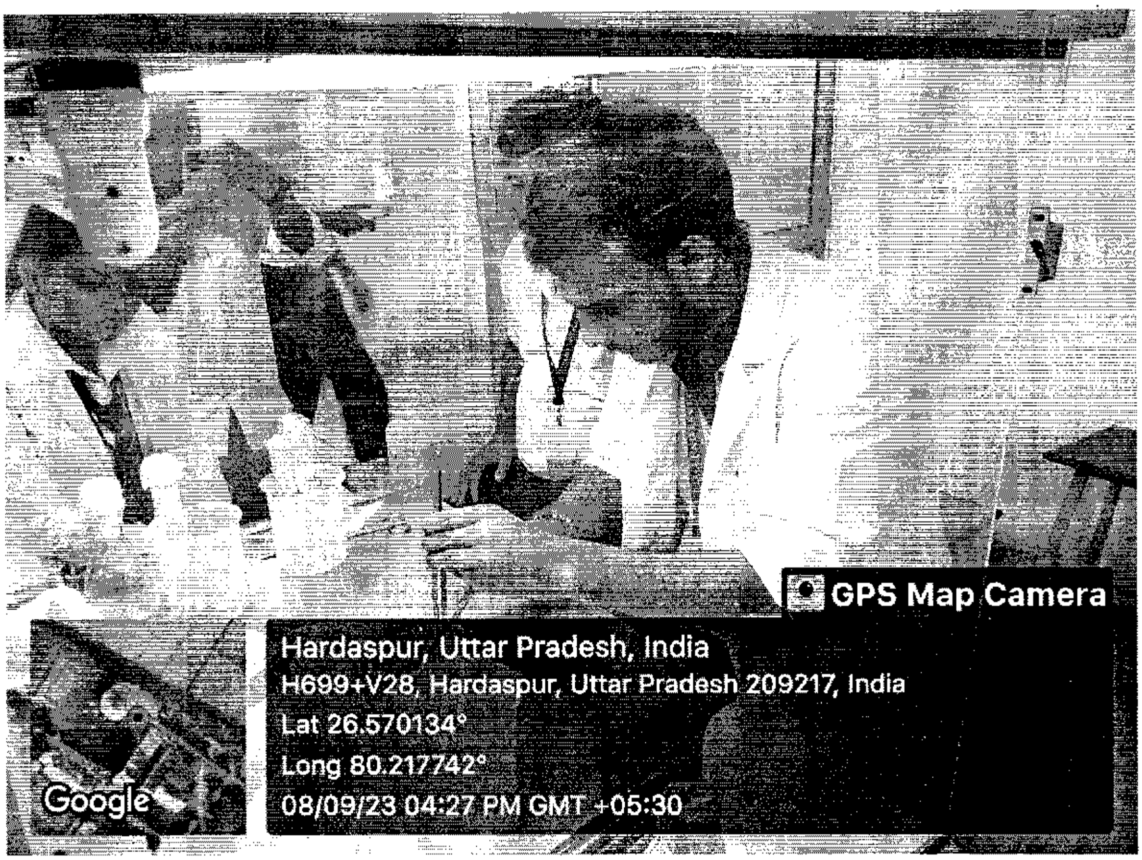
Prabhat
Ranjan

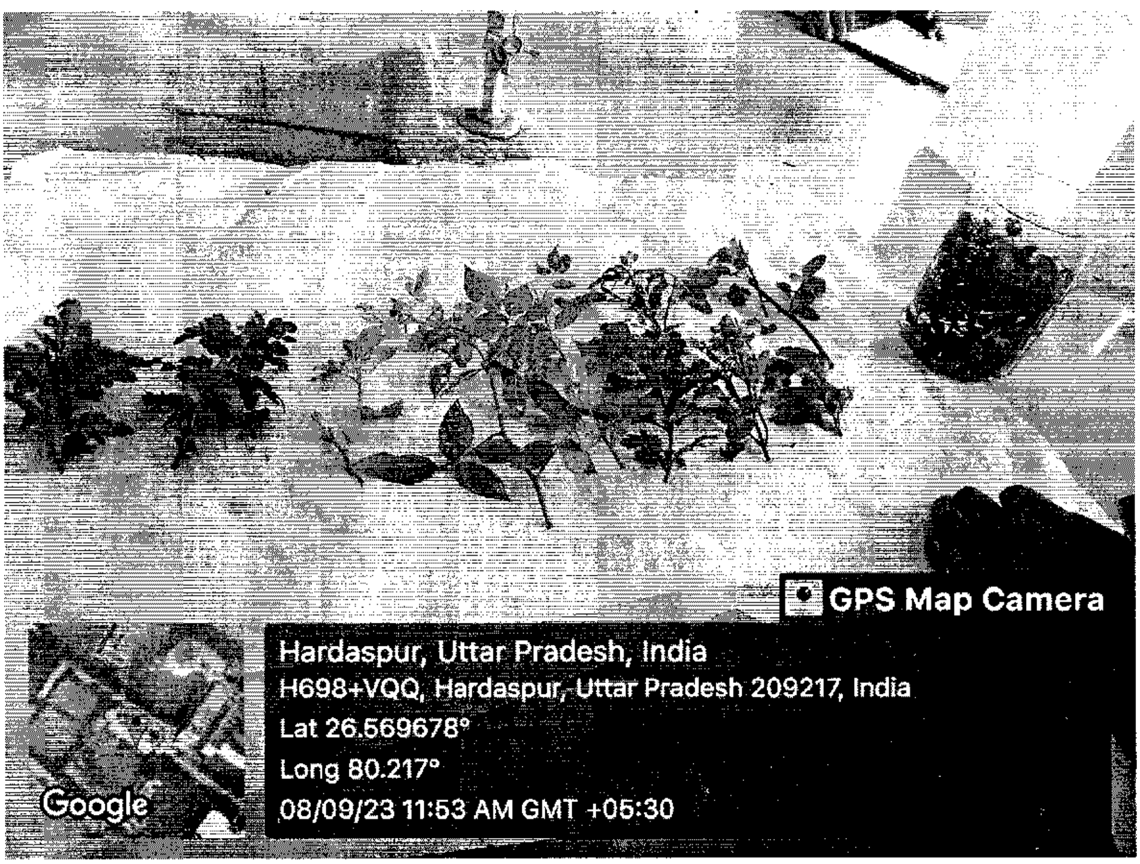


Prabhat Ranjan

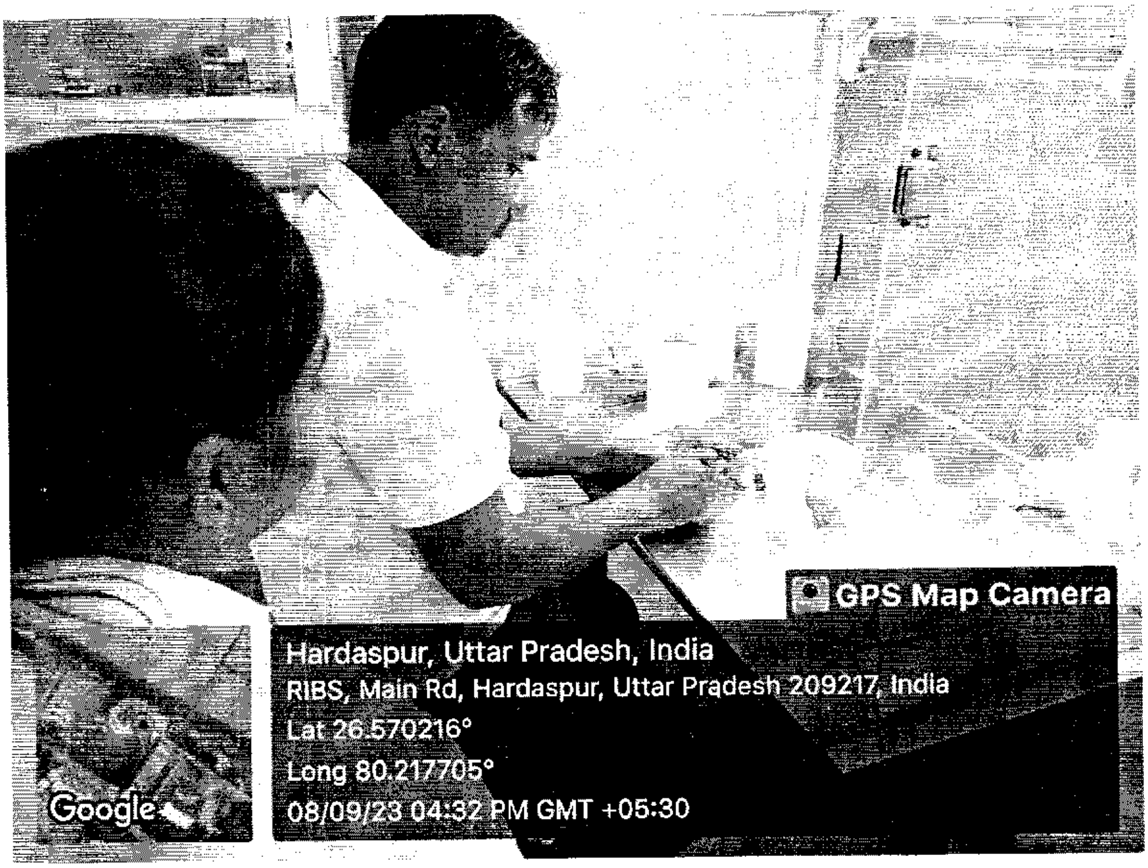


Prabhat Ranjan

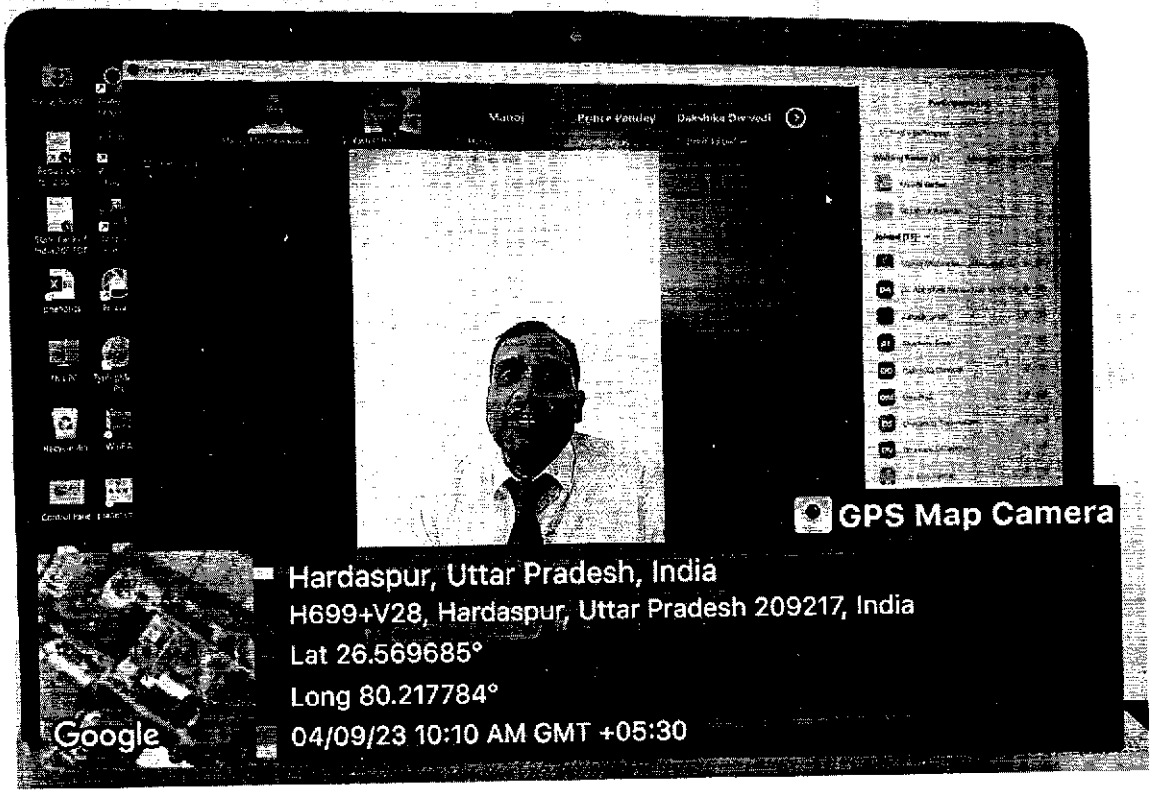


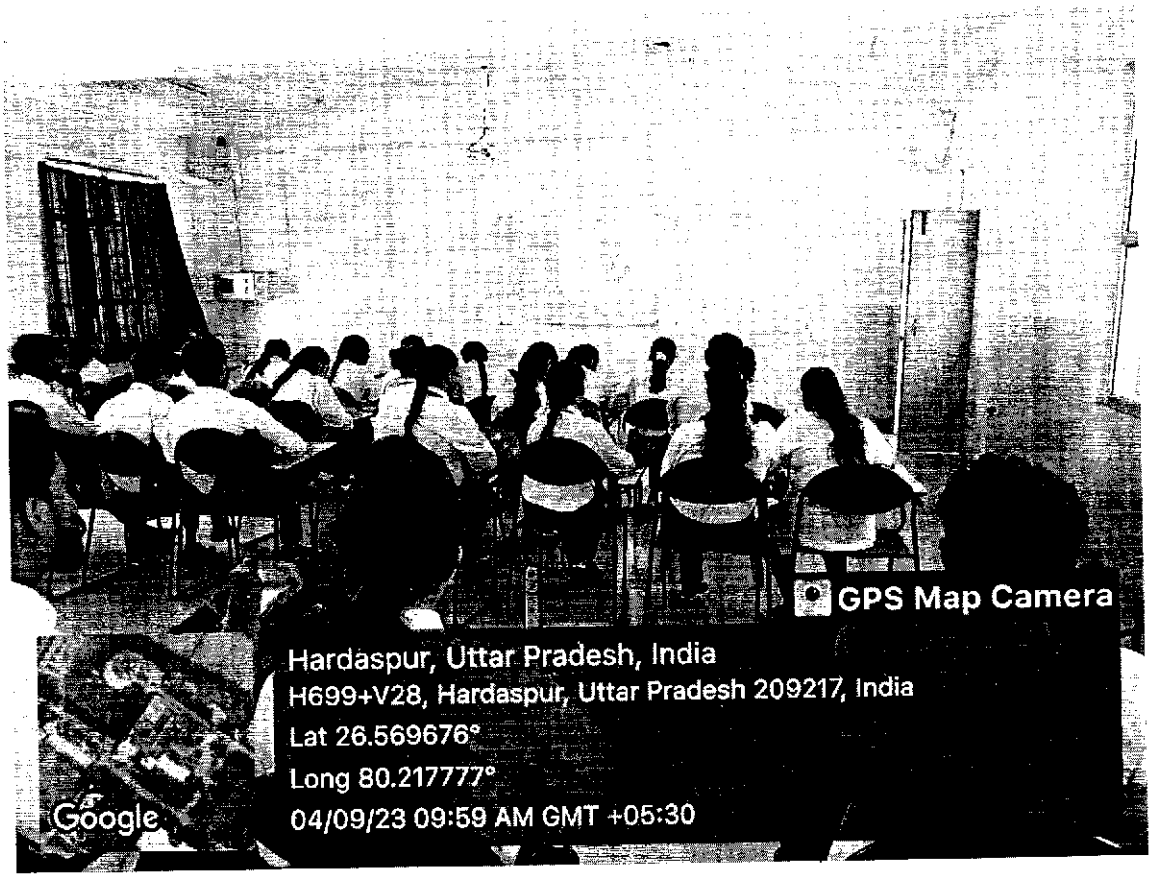


Prabhat
Ranjan



Prabhat Ranjan





Prabhat Ranjan