DEPARTMENT OF MOLECULAR BIOLOGY AND BIOTECHNOLOGY

ACHARYA NARENDRA DEVA UNIVERSITY OF AGRICULTURE & TECHNOLOGY

KUMARGANJ, AYODHYA - 224 229, UTTAR PRADESH

OVERVIEW OF THE DEPARTMENT

The department of Molecular Biology and Biotechnology was established in the university in the year 2004. The UG degree programme B.Tech. Biotechnology commenced from the session: July, 2023. The M.Sc. (Ag.) degree programme in Agricultural Biotechnology commenced from the session: July, 2004. The Ph.D. degree programme in Agricultural Biotechnology started from the year July, 2008. The department offers courses in Agricultural Biotechnology for under-graduate, post-graduate and Ph.D. students of College of Agriculture, College of Fisheries, and College of Horticulture & Forestry. The Department is well-equipped with laboratories for molecular work.

Vision:

The vision of the department is to become a premier and recognized centre of excellence in teaching and research. The faculties of the department are actively engaged in providing quality education to the students for transforming their lives, and making them future professionals and academicians.

Mandates:

- To impart core and conceptual knowledge of agricultural biotechnology to the students.
- To provide global recognition to the under-graduate, post-graduate and Ph.D. students through innovative research in theoretical and applied biotechnology.
- To usemolecular approaches for incorporating abiotic and biotic resistance in crop plants.
- To develop trained manpower in the area of plant biotechnology.

EMPLOYEES PROFILE

(A) TEACHING STAFF

Name	**Dr. Devendra Kumar Dwivedi**	
Qualification	Ph.D., PDF IRRI, Phillipenes	
Designation	Professor & Head	
Research Specialization	Rice Breeder,Marker Assisted Selection, Abiotic Stresses, Molecular Breeding	
ContactNo.	9415720287, 7706884188	
E-mailaddress	ddwivedi2000@gmail.com, ddwivedi2000@nduat.org	

Name	**Dr. Nawaz Ahamad Khan**	
Qualification	Ph.D. (Biochemistry)	
Designation	Professor	
Research Specialization	Molecular Biology of Biotic and Abiotic Stress, Enzymology, Molecular Techniques, Immunology	
ContactNo.	9721131949,9415716264	
E-mailaddress	nakhan0110@nduat.org, nakhan0110@gmail.com	

Name	**Dr. Shambhoo Prasad**	
Qualification	Ph.D. (Crop Physiology)	
Designation	Professor	
Research Specialization	Abiotic Stress, Drought, Submergeance, Temperature, Salinity and its molecular aspects.	
ContactNo.	9450766603	
E-mailaddress	shambhoobiotech@nduat.org, shambhoonduat@gmail.com	

Name	**Dr.Adesh Kumar**	
Qualification	Ph.D. (Microbiology)	
Designation	Associate Professor	
Research Specialization	Bioprospecting of Microorganisms	
ContactNo.	7355172814	
E-mailaddress	adeshkumar@nduat.org	

Name	**Dr. Hemant Kumar Yadav**	
Qualification	Ph.D. (Ag. Biotechnology)	
Designation	AssistantProfessor	
Research Specialization	Genetic Engineering, Molecular aspects for Biotic and Abiotic Stresses, Tissue Culture	
ContactNo.	9451460379	
E-mailaddress	hemant6358@gmail.com	

Name	**Dr.Ashwini Kumar**	
Qualification	Ph.D. (Ag. Biotechnology)	
Designation	AssistantProfessor	
Research Specialization	Genetic Engineering, Molecular Diagnostics, Micropropagation, and Virus Indexing	
ContactNo.	9027150077	
E-mailaddress	ashwinikumar1500@gmail.com	

(B) NON-TEACHING STAFF

Name	**Sri Satish Kumar**	
Designation	Junior Assistant	
ContactNo.	9889090820	
E-mail address	satishkumar988909@gmail.com	

Name	**Sri Aditya Kumar Singh**	
Designation	Messenger	
ContactNo.	9889090820	
E-mail address	satishkumar988909@gmail.com	

DEGREE PROGRAMMES

(A) Degree Programmes offered in the Department

- **B. Tech. Biotechnology**
- **M.Sc. (Ag.) Agricultural Biotechnology**
- **Ph.D. (Agricultural Biotechnology)**

(B) Students Enrolled in the Department during last 6 years

- **B. Tech. Biotechnology**

Academic Year	2023-24
No. of Students	13

- **M.Sc. (Ag.) Agricultural Biotechnology**

Academic Year	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
No. of Students	11	01	04	06	08	08	09

- **Ph.D. (Agricultural Biotechnology)**

Academic Year	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
No. of Students	01	01	03	02	02	04	02

Graduate, Post-Graduate and Ph.D. Courses

- **Courses for GraduateB. Tech. Biotechnology**
- **Courses for M.Sc. (Ag.) Agricultural Biotechnology**
- **Courses for Ph.D. (Agricultural Biotechnology)**

(A) Courses for Graduation B. Tech. Biotechnology

Courses for B. Tech. Biotechnology Degree Programme

(From Academic Session: 2023-24 onwards)

Course No.	Course Title	Credit
SEMESTER-I		
Bot. 101/ Math. 101	Basic Botany/Basic Mathematics - I	3 (2+1/3+0)
Agron. 101	Crop Production Technology	3 (2+1)
Biotech.101	Cell Biology	2 (2+0)
Biotech.102	Basic Genetics	3 (2+1)
Biotech.103	Introduction to Biotechnology	3 (2+1)
CSPD 101	Communication Skills and Personality Development	2 (1+1)
Env. 101	Environmental Studies and Disaster Management	3 (2+1)
FT 101	Food Science and Processing	2 (1+1)
HD 101	Human Ethics	1 (1+0)
	NCC/NSO/NSS	1 (0+1 NC)
	Total Credit	**23 (16+6/15+7 (22) +1NC)**
SEMESTER-II		
Zoo. 101/ Math. 102	Basic Zoology/ Basic Mathematics - II	2+1/3+0
Biotech. 104	Plant Tissue Culture	3 (3+0)
Biotech. 105	Molecular Biology	3 (2+1)
Bot./ Zoo. 102	Biodiversity and its Conservation	2 (2+0)
*Hort. 101/ **AS 101	Production technologies for Horticultural Crops/ Anatomy and Physiology of Livestock	3 (2+1/3+0)
Micro. 101	Microbiology	3 (2+1)
*PB 101/ **AS 102	Basics of Plant Breeding/ Introduction to Animal Breeding	3 (2+1)
Stat. 101	Basic Statistics	2 (1+1)
	NCC/NSO/NSS	1 (0+1)
	Total credit	**23 (16+6/ 15+7(22)+1 NC)**
SEMESTER-III		
AS 201	Livestock Production and Management	3 (2+1)
Biotech. 201	Recombinant DNA Technology	3 (2+1)
Bot. 201	Plant Physiology	3 (2+1)
ICT 201	Information and Communication Technology	2 (1+1)
Econ. 201	Economics and Marketing	3 (2+1)
*Ent. –Pl. Path. 201/ ** AS 202	Fundamentals of Crop Protection/ Livestock Product Technology	3 (2+1)
Math. 201	Biomathematics	3 (2+1)
*PB 201/ **AS 203	Breeding of Field Crops/ Animal Health Care	3 (2+1)
	NCC/NSO/NSS	1 (0+1 NC)
	Total Credits	**24 (15+8(23)+1 NC)**

SEMESTER-IV		
EDBM 201	Entrepreneurship Development and Business Management	2 (1+1)
Biochem. 201	General Biochemistry	4 (3+1)
Biotech. 202	Introductory Bioinformatics	3 (2+1)
Biotech. 203	Plant Genetic Transformation	3 (2+1)
Biotech./ECE 204	Electronics and Instrumentation in Biotechnology	2 (1+1)
Biotech. 205	Classical and Molecular Cytogenetics	3 (2+1)
Micro. 201	Microbial Genetics	3 (2+1)
Phy. 201	Biophysics	3 (2+1)
	NCC/NSO/NSS	1 (0+1 NC)
	Total Credits	**24 (15+8 (23) +1 NC)**
SEMESTER-V		
Biochem. 301	Enzymology and Enzyme Technologies	3 (2+1)
Biotech. 301	Immunology	3 (2+1)
Biotech 302	Molecular Genetics	2 (2+0)
Biotech 303	Nanobiotechnology	2 (2+0)
Biotech 304	Animal Biotechnology	4 (3+1)
Biotech 305	Molecular Marker Technology	2 (2+0)
Biotech 306	Genomics and Proteomics	3 (3+0)
Biotech 307	IPR, Biosafety and Bioethics	2 (2+0)
ICT 301	Agricultural Informatics	3 (2+1)
	Total Credits	**24 (20+4)**
SEMESTER-VI		
Biotech. 308	Computational Biology	3 (2+1)
Stat. 301	Biostatistics	3 (2+1)
Optional/ Elective Courses (6)	Electives (4): Only one to be chosen (each with six courses)	18
	1. Plant Biotechnology	18 (12+6)
	2. Animal Biotechnology	18 (13+5)
	3. Microbial and Environmental Biotechnology	18 (14+4)
	4. Bioinformatics	18 (11+7)
	Total Credits	**24 (16+8/17+7 18+6/15+9)**
SEMESTER-VII		
Course No.	**Module***	**Credit**
Biotech. 491 Student READY - In-house Skill Development Modules	1. Plant Biotechnology 2. Animal Biotechnology 3. Microbial and Environmental Biotechnology 4. Bioinformatics *To opt only one module as per the chosen elective	20 (0+20)
	Educational Tour	2 NC
	Total Credits	**22 (0+20+2NC)**
SEMESTER-VIII		
Biotech. 492	Student READY - Project Formulation, Execution and Presentation	10 (0+10)
Biotech. 493	Student READY - Entrepreneurial Development in Biotechnology (- On-campus/Off Campus)	10 (0+10)
	Total Credits	**20 (0+20)**
	Overall credit	**184 (98+80+ 6NC)**

(B) Courses for M.Sc. (Ag.) Agricultural Biotechnology

Courses for M.Sc. (Ag.) (Agricultural Biotechnology) Degree Programme

(From Academic Session: 2022-23 onwards)

Courses	Course No.	Course Title	Credit
SEMESTER-I			
Major Course	MBB-503	Molecular Cell Biology (core)	3 (3+0)
	MBB-510	Microbial and Industrial Biotechnology(Optional)	3 (2+1)
	MBB-509	Plant Tissue culture (Optional)	3 (2+1)
Minor Course	GPB-502	Principles of Plant Breeding	3 (2+1)
Supporting Course	STAT-502	Statistical Methods for Applied Sciences	4 (3+1)
CommonCourse	PGS-504	Basic Concepts in Laboratory Techniques	1 (0+1)
	PGS-503	Intellectual Property and its Management in Agriculture	1 (1+0)
Thesis Research	MBB-599	M.Sc.(Ag) Research	3 (0+3)
		Total Credit	**21 (13+8)**
SEMESTER-II			
Major Course	MBB-502	Fundamentals of Molecular Biology(Core)	3 (3+0)
	MBB-506	Plant Genetic Engineering(Optional)	3 (3+0)
Minor Course	GPB-509	Hybrid Breeding	3 (2+1)
Common Course	PGS-502	Technical Writing and Communications Skills	1 (0+1)
	PGS-505	Agricultural Research, Research Ethics and Rural Development Programmes	1 (1+0)
Thesis Research	MBB-599	M.Sc.(Ag) Research	6 (0+6)
		Total credit	**18(10+8)**
SEMESTER-III			
Major Course	MBB-505	Omics and Systems Biology(Core)	3 (2+1)
Minor Course	GPB-510	Seed Production and Certification	2 (1+1)
Supporting Course	BIOCHEM-501	Basic Biochemistry	4 (3+1)
Common Course	PGS-501	Library and Information Services	1(0+1)
Thesis Research	MBB-599	M.Sc.(Ag) Research	10 (0+10)
		Total Credits	**21(6+15)**
SEMESTER-IV			
Major Course	MBB-504	Techniques in Molecular Biology I (Core)	3 (0+3)
Seminar	MBB-591	M.Sc.(Ag) Seminar	1 (0+1)
Thesis Research	MBB- 599	M.Sc.(Ag) Research	6 (0+6)
	MBB-599	M.Sc.(Ag) Thesis	5 (0+5)
		Total Credits	**15(0+15)**
		Overall credit	**74 (28+46)**

(C) Courses for Ph.D. (Agricultural Biotechnology)

Courses for Ph.D. (AgriculturalBiotechnology) Degree Programme

(From Academic Session: 2022-23 onwards)

Courses	Course No.	Course Title	Credit
SEMESTER-I			
Major Course	MBB - 601	Plant Molecular Biology(Core)	3 (3+0)
Minor Course	GPB - 601	Advances in Plant Breeding System	3 (3+0)
		or	
	PL PATH- 603	Advances in plant pathogenic prokaryotes	3 (2+1)
Supporting Course	STAT- 502	Statistical methods for applied sciences	4(3+1)
Common Course	PGS-504	Basic concept in Laboratory Techniques	1(0+1)
Research	MBB-699	Doctoral Research	5(0+5)
		Total Credit	**19(11+8)**
SEMESTER-II			
Major Course	MBB - 607	Plant Hormones &Signaling(Optional)	2 (2+0)
Minor Course	PL PATH- 601	Advances in Mycology	3(2+1)
		OR	
	GPB - 605	Genomics in Plant Breeding	3 (3+0)
Common Course	PGS-502	Technical Writing and Communication	1(0+1)
Research	MBB-699	Doctoral Research	8(0+8)
		Total Credit	**17(7+10)**
SEMESTER-III			
Major Course	MBB - 602	Plant Genome Engineering (Core)	3 (3+0)
Supporting Course	BIOCHEM - 501	Basic Biochemistry	4 (3+1)
Common Course	PGS-501	Library and Information Services	1(0+1)
Research	MBB-699	Doctoral Research	12(0+12)
		Total Credit	**20(6+14)**
SEMESTER-IV			
Major Course	MBB - 604	Commercial Plant Tissue Culture	2 (2+0)
	MBB - 606	RNA Biology	1 (1+0)
Common Course	PGS - 503	Intellectual Property and its	1(1+0)

		Management in Agriculture	
	PGS - 505	Agricultural Research, Research Ethics and Rural Development Programme	1(1+0)
Research	MBB-699	Doctoral Research	15(0+15)
		Total Credit	**20(5+15)**
SEMESTER-V			
Major Course	MBB- 605	Plant Microbes Interaction	2 (2+0)
Seminar	MBB- 691	Ph.D. Seminar-I	1(0+1)
Research	MBB-699	Doctoral Research	15(0+15)
		Total Credit	**18(2+16)**
SEMESTER-VI			
Seminar	MBB- 691	Ph.D. Seminar-II	1(0+1)
Research	MBB-699	Doctoral Research	15(0+15)
		Ph.D. Thesis	5(0+5)
		Total Credit	**21(0+21)**
		Overall credit	**115(31+84)**

Courses for Ph.D. (Agricultural Biotechnology) Degree Programme

(Upto the Academic Session: 2021-22)

Courses	Course No.	Course Title	Credit
Major Course	BT- 612	Gene Cloning	3(1+2)
	BT-613	Transformation Technology	2(1+1)
	BT-621	Advances in molecular marker technology	3(2+1)
	BT- 616	Molecular Biology of Abiotic Stress	3(2+1)
	BT- 617	Gene of Agronomic importance and its application	2(2+0)
	BT- 622	Advances in plant genetic engineering	3(2+1)
	BT-691	Ph.D. Seminar	2(0+2)
	BT-700	Ph.D. Research	45(40+5)
Minor Course	GPB-521	Methods of Plant Breeding	3(2+1)
	GPB-522	Principles of Quantitative Genetics	3(2+1)
Supporting Course	BIOCHEM- 614	Molecular Biochemistry	3(3+0)
	STAT-511	Essential Statistical Methods	3(2+1)
	LIB-511	Use of Scientific and Technical Literature	1 (1+0)
		Total credit	**76(59+17)**

Classrooms and Laboratories:

Number of class rooms:5 (UG and PG)

Functional laboratories available for the degree programme: *Eight*, The laboratory is sufficient to conduct the practical classes and also for the B.Tech. (Biotech.), M.Sc. (Ag) and Ph.D. thesis work.

LIST OF MAJOR EQUIPMENTS IN LABORATORIES:

- PCR machine
- Gel Doc
- Incubator
- Laminar air flow
- Shaker
- Spectrophotometer
- Distillation unit
- Gene gun
- Deep freezer
- 2D Gel unit
- Electrophoresis unit (Horizontal and vertical)
- Water Bath
- Ice Flicker
- pH meter
- HPLC
- ELISA reader
- Deep Freezer
- Centrifuge machine
- Auto clave
- Electronic balance
- Microscope
- Analytical Balance
- Test tube
- Protein IEF Cell
- RotamantlesRemi
- Vortexer
- Cyclomixersremi
- Magnetic stirrer
- UV Light Transilluminator
- Trans Blot SD(Semi dry transfer cell)
- Nanodrop

Photos of instruments

Conducting the practical class of undergraduate students

Name of Laboratories:

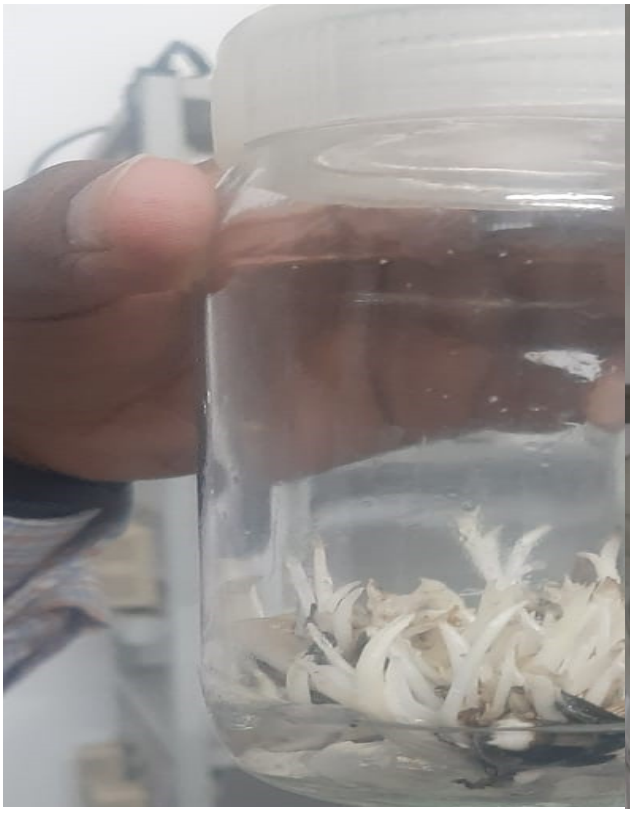
U.G Lab I

U.G Lab II

Molecular Abiotic Stress Lab

Marker Assisted Selection Abiotic Lab

Tissue Culture Lab



1. Bioprospecting Lab
2. Molecular Biotic Stress Lab
3. Nutritional Genomics Lab
4. Transformation Lab
5. IPR Cell

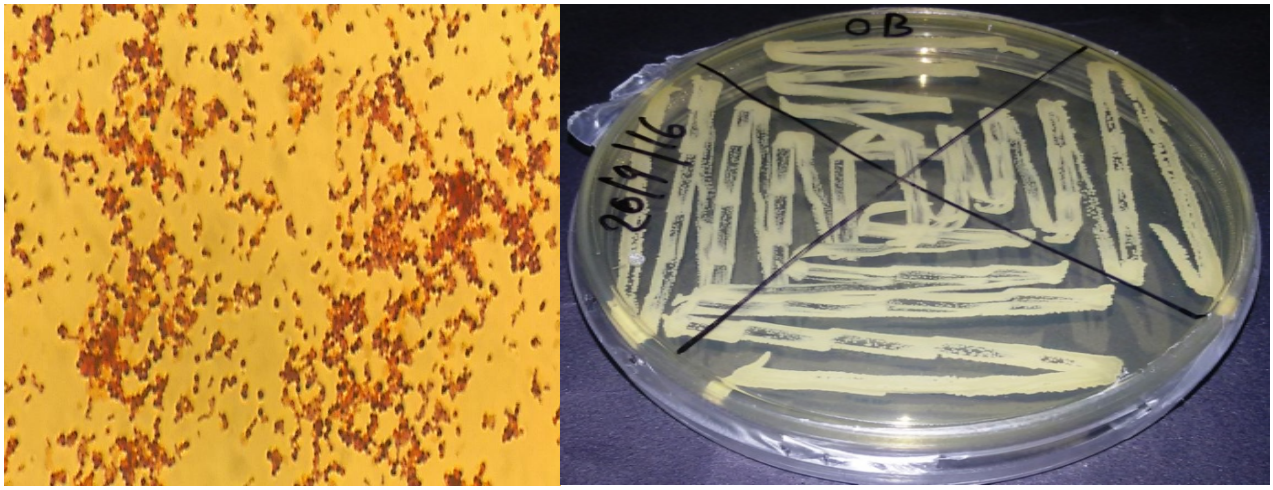
Farm facilities Available: Net house and Glass house.

Student Instructional Farm is available to conduct the field experiment of students

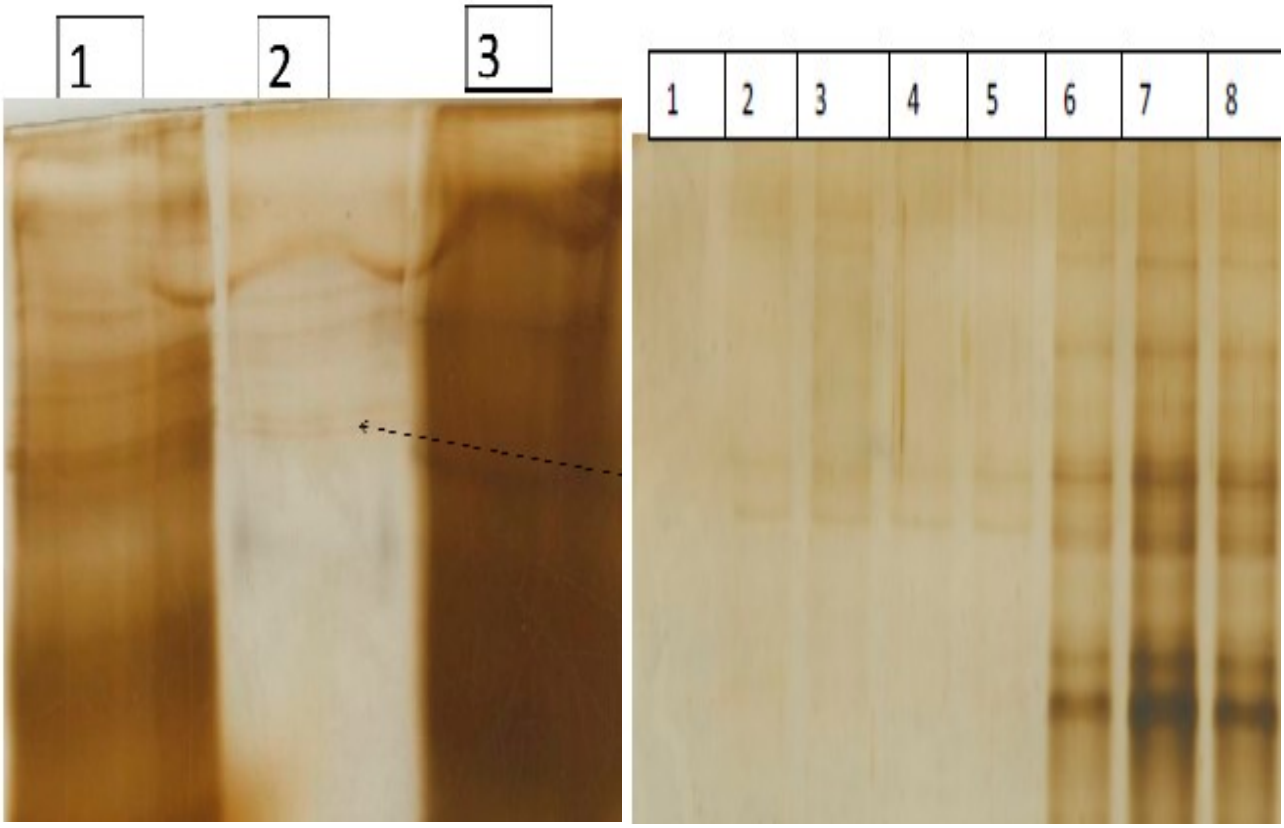
Conduct of practical and Hands-on-training: Practical classes are available for each course and for each degree programme.

Research Work by Students

Identification of micro organism *(bacteria)*



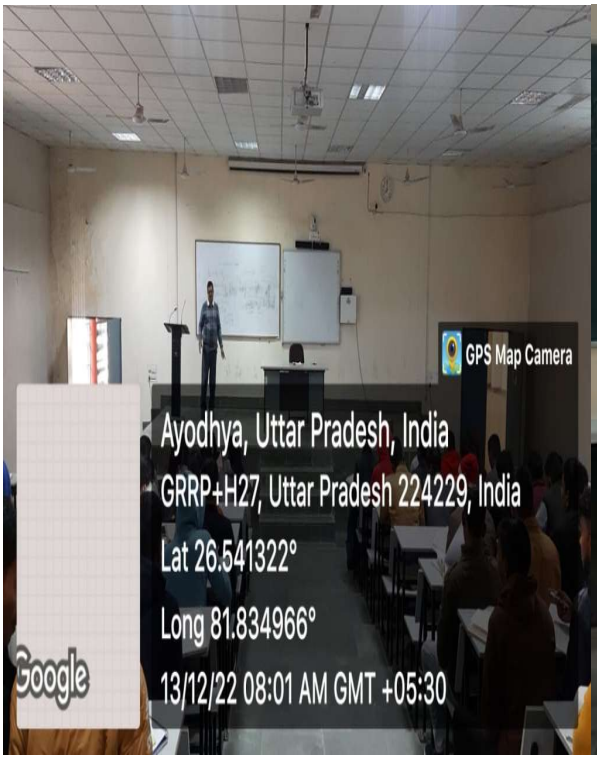
Colonies after gram staining of bacteria.Cultured Bacterial plate of Bacterial strain-B on LB-Agar media



SDS-PAGE Analysis of fractioned purified Protein.(1) 60 % , (2) 70 % & (3) Crude protein, M- Marker.

View of different Laboratories

View of Classrooms



View of Field Trial

View of Departmental Library

Fresher party celebration

Farewell party celebration


FAREWELL
PARTY 2023