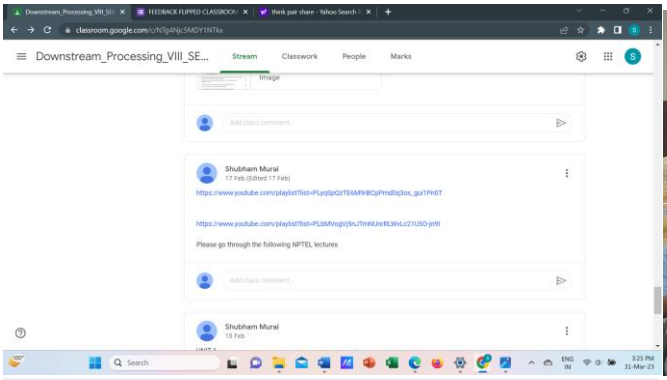
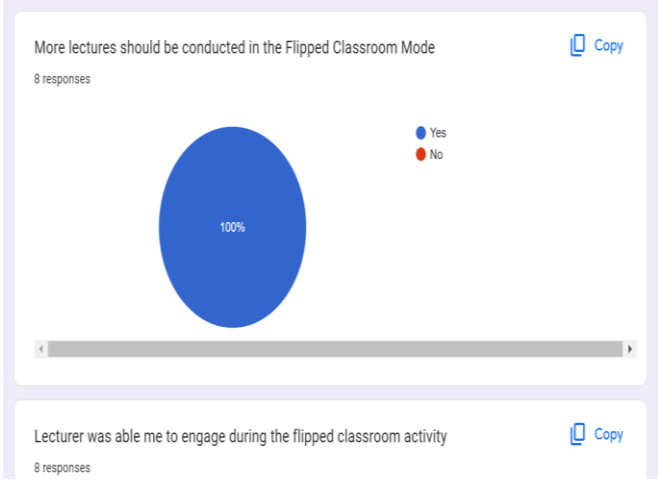
Priyadarshini College of Engineering, Nagpur
Department of Biotechnology

Innovations in Teaching learning process

Teaching learning Method:	Flipped Classroom
Topic:	Downstream Processing
Source:	NPTEL (youtube)
Name of the Faculty:	Mr. Shubham Murai
Resource Person:	Dr. Mukesh Dhoble
ICT Tools Used:	NPTEL, Google Classroom, Youtube
Brief Description:	Downstream Processing by Prof. Mukesh Doble, Department of Biotechnology, IIT Madras. Was an exploratory lecture on basic DSP techniques
Target Audience:	VIII
Number of Students Involved:	30
Outcome:	Through this class the students fulfilled CO1, 2,3, &4 POs 3,5, 8, 9, 10 and 12.
Feedback:	https://forms.gle/uV7hm7UWRj3rJjyf7
Activity/Discussion/Test/Quiz:	Discussion (Think Pair Share)

Photograph (if any):



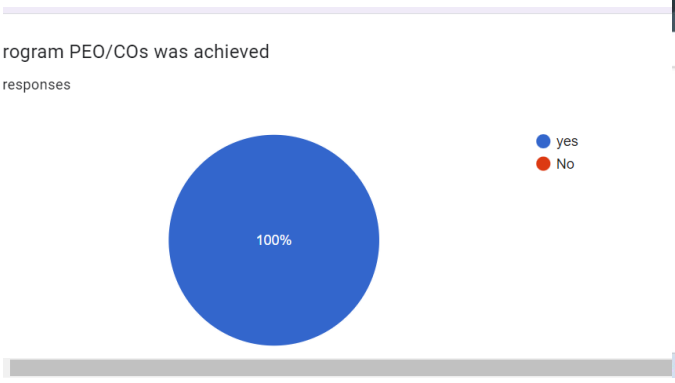


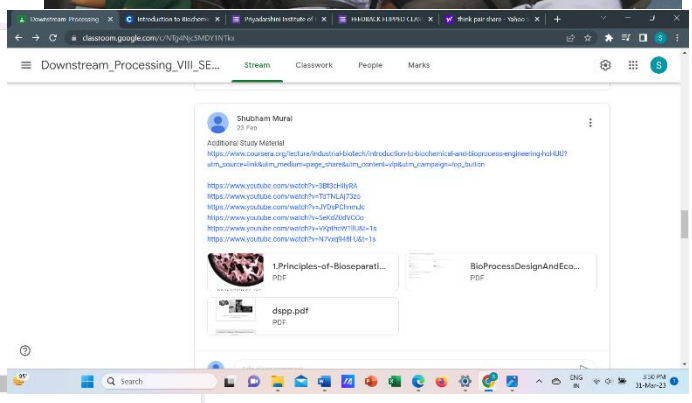
Priyadarshini College of Engineering, Nagpur
Department of Biotechnology

Innovations in Teaching learning process

Teaching learning Method:	Flipped Classroom
Topic:	**Industrial Biotechnology**
Source:	Coursera
Name of the Faculty:	Mr. Shubham Murai
Resource Person:	Prof. Nicholas Turner Prof. Nigel Scrutton **Dr. Nick Weise**
ICT Tools Used:	Coursera, Google Classroom
Brief Description:	Introduction to Biochemical and Bioprocess Engineering in Industrial Biotechnology by university of Manchester were good at explaining concept.
Target Audience:	VIII
Number of Students Involved:	32
Outcome:	Through this class the students fulfilled CO1,5 & 6 POs 5, 8, 9,10 and 12.
Feedback:	https://forms.gle/fnupMPQq9tts6D4e8
Activity/Discussion/Test/Quiz:	Discussion (Think Pair Share)

Photograph/ Documentary Proof (if any):





Priyadarshini College of Engineering, Nagpur
Department of Biotechnology

Innovations in Teaching learning process

Teaching learning Method:	Spoken Tutorial
Topic:	Downstream Processing
Source:	NPTEL (youtube)
Name of the Faculty:	Mr. Shubham Murai
Resource Person:	Dr. Mukesh Dhoble
ICT Tools Used:	NPTEL, Youtube
Brief Description:	Downstream Processing by Prof. Mukesh Doble, Department of Biotechnology, IIT Madras. Was an exploratory lecture on basic DSP techniques
Target Audience:	VIII
Number of Students Involved:	30
Outcome:	Through this class the students fulfilled CO1, 2,3, &4 POs 3,5, 8, 9, 10 and 12.
Feedback:	
Activity/Discussion/Test/Quiz:	Discussion (Think Pair Share)

Photograph (if any):

Priyadarshini College of Engineering, Nagpur
Department of Biotechnology

Innovations in Teaching learning process

Teaching learning Method:	Flipped Classroom/ Spoken Tutorial
Topic:	**Factors responsible for food spoilage**
Source:	NPTEL/open source
Name of the Faculty:	Mrs. Nisha A. Nikam
Resource Person:	Dr. R. Anandlakshmi IIT Guwahati
ICT Tools Used:	NPTEL, Google Classroom
Brief Description:	Food Microbiology: Microbial Growth and Concerns in Various Foods NPTEL IIT Guwahati
Target Audience:	VIII
Number of Students Involved:	21
Outcome:	Through this class the students fulfilled CO1,2,3 POs. 6, 7 10
Feedback:	https://www.youtube.com/watch?v=shWayTlt4hk
Activity/Discussion/Test/Quiz:	

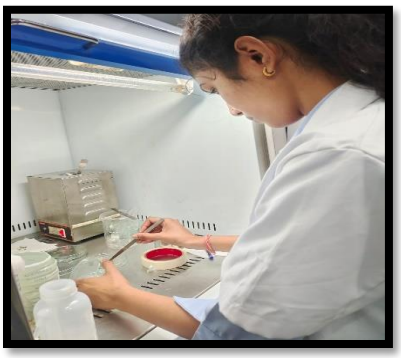
Photograph/ Documentary Proof (if any):

Priyadarshini College of Engineering, Nagpur
Department of Biotechnology

Innovations in Teaching learning process

Teaching learning Method:	**Plant Tissue Culture Project in Laboratory**
Title of the Innovation in TL Process:	**Multiple shoot induction in medicinal plant Clitoria**
Name of the Faculty:	**Mrs. Nisha A. Nikam**
ICT Tools Used:	**Swayam and YouTube videos on plant tissue culture for multiple organogenesis**
Brief Description:	**The perennial leguminous herb *Clitoria ternatea* (butterfly pea) has attracted significant interest based on its agricultural and medical applications, which range from use as a fodder and nitrogen fixing crop, to applications in food coloring and cosmetics, traditional medicine and as a source of an eco-friendly insecticide**
Number of Students Involved:	**25**
Outcome:	**Multiple shoot induction was observed in Clitoria**
Feedback:	**Students performed all the activities for the project. They prepared media required for seed germination, callus induction, and regeneration.**
Activity/Discussion/Test/Quiz:	**Students had hands on techniques for all the steps of plant tissue culture.**

Photograph (if any):



a. and b. Students inoculating various explants on laminar air flow

C. Germinated seeds of Clitoria **D. Multiple shoot induction using apical meristem explant**

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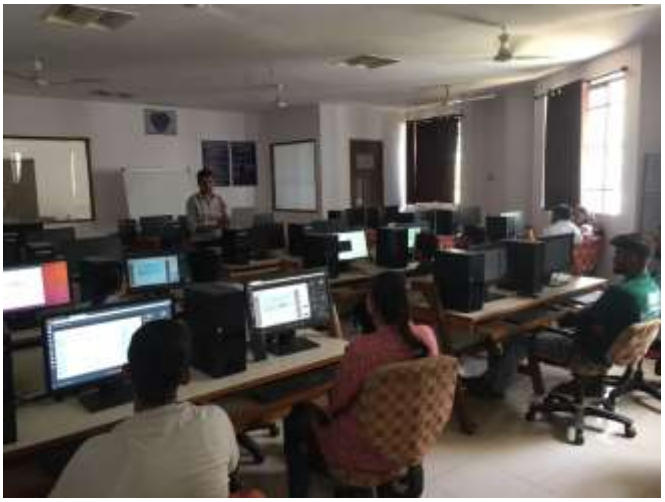
Innovations in Teaching learning process

Teaching learning Method:	Flipped Classroom/ Spoken Tutorial
Topic:	CTPM- Boundary value problem – shooting method
Source:	NPTEL/open source
Name of the Faculty:	Mr.P.A.Raut
Resource Person:	
ICT Tools Used:	Google Classroom, ppt
Brief Description:	Flipped class was conducted for VIII sem students on 12th April 2023 for which the learning material of solving Boundary value problem using shooting method was shared in google classroom on 11th April 23. Converting BVP into IVP and then solving IVP using suitable numerical method to get desired boundary value was discussed under given topic.
Target Audience:	VIII
Number of Students Involved:	25
Outcome:	Through this class the students fulfilled POs 5, 8 and 12 and PSO 1 and 2.
Feedback:	https://forms.gle/nA6Jp26LJCNyfv4f7
Activity/Discussion/Test/Quiz:	**Discussion**

Photograph/ Documentary Proof (if any):



Priyadarshini College of Engineering, Nagpur
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Innovations in Teaching learning process

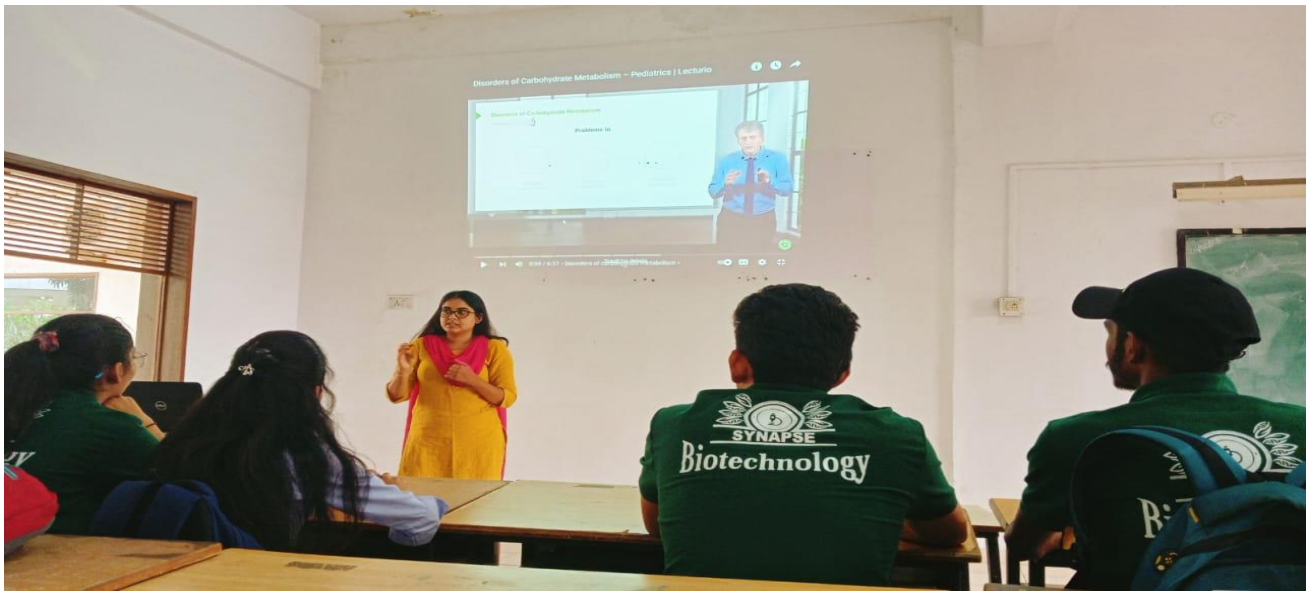
Teaching learning Method:	Spoken Tutorial
Topic:	**Basic Enviornmental Engineering and Pollution Abetment**
Source:	NPTEL
Name of the Faculty:	Mr. Y. P. Moharkar
Resource Person:	Dr.Prasenjit Mondal, Dept. of Chemical Engineering, IIT Roorkee
ICT Tools Used:	NPTEL,
Brief Description:	The course deals with the fundamentals of environmental engineering and its application in pollution control. It is intended to impart the fundamental knowledge of environmental engineering along with the design aspect of some pollution control equipment. It will also help the young scientific professionals to keep their knowledge upgraded with the current thoughts and newer technology options along with their advances in the field of the environmental/industrial pollution abatement.
Target Audience:	IV
Number of Students Involved:	35
Outcome:	Through this class the students fulfilled CO1, POs 5, 8 and 12.
Feedback:	https://www.youtube.com/watch?v=NRoFvz8Ugeo&list=PLLy_2iUCG87Cr__rs9sS1zSaR62imd0uB
Activity/Discussion/Test /Quiz:	**Discussion**
Photograph (if any):	**01**

Priyadarshini College of Engineering, Nagpur
Department of Biotechnology

Innovations in Teaching learning process

Teaching learning Method:	Flipped Classroom/ Spoken Tutorial
Topic:	Disorders of Carbohydrate metabolism
Source:	open source
Name of the Faculty:	Ms. Aishwarya Patil
Resource Person:	Dr. Brian Alverson
ICT Tools Used:	Google Classroom
Brief Description:	The video was shared with students on 24th march 2023 via Google classroom and was discussed with the students on 27th March 2023. Carbohydrate metabolism disorders are a group of metabolic disorders. The metabolism of the carbohydrates galactose, fructose, and glucose is intricately linked through interactions between different enzymatic pathways, and disorders that affect these pathways may have symptoms ranging from mild to severe or even life-threatening.
Target Audience:	IV Semester
Number of Students Involved:	38
Outcome:	Through this class the students fulfilled CO1, POs 1, 4 and 12.
Feedback:	https://forms.gle/YMEoxHYzUoo8iApQA
Activity/Discussion/Test/Quiz:	Discussion

Photograph/ Documentary Proof (if any):



Priyadarshini College of Engineering, Nagpur
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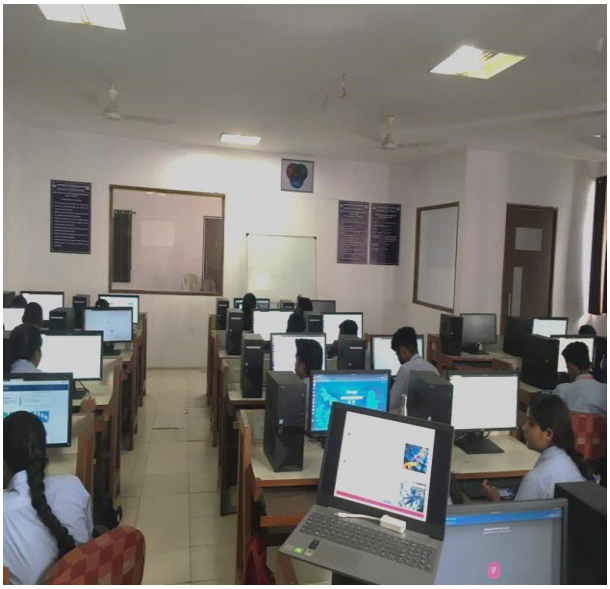
Innovations in Teaching learning process

Teaching learning Method:	Flipped Classroom
Topic:	Basic Local Alignment Search Tool (BLAST) for bioinformatics
Source:	NCBI open source
Name of the Faculty:	Mr. A.D. Chahande
Resource Person:	
ICT Tools Used:	NPTEL, Google Classroom, NCBI
Brief Description:	Information and hands on experimentation was conducted on a topic Basic Local Alignment Search Tool (BLAST) for bioinformatics
Target Audience:	IV
Number of Students Involved:	28
Outcome:	Through this class the students fulfilled PSO1, PSO2 & POs 2,5,9,12.
Feedback:	Link- https://docs.google.com/forms/d/1vH_FJHtvvCeYPF4qXs-JdZNe8jBAF_wdraXHgYiZ5vo/edit
Activity/Discussion/Test/Quiz:	First, the specifics of the bioinformatics application of BLAST (Basic Local Alignment Search Tool) were covered. The NCBI BLAST portal for proteins and nucleotides was then used. Students were later instructed to explore the BLAST portal by switching parameters.



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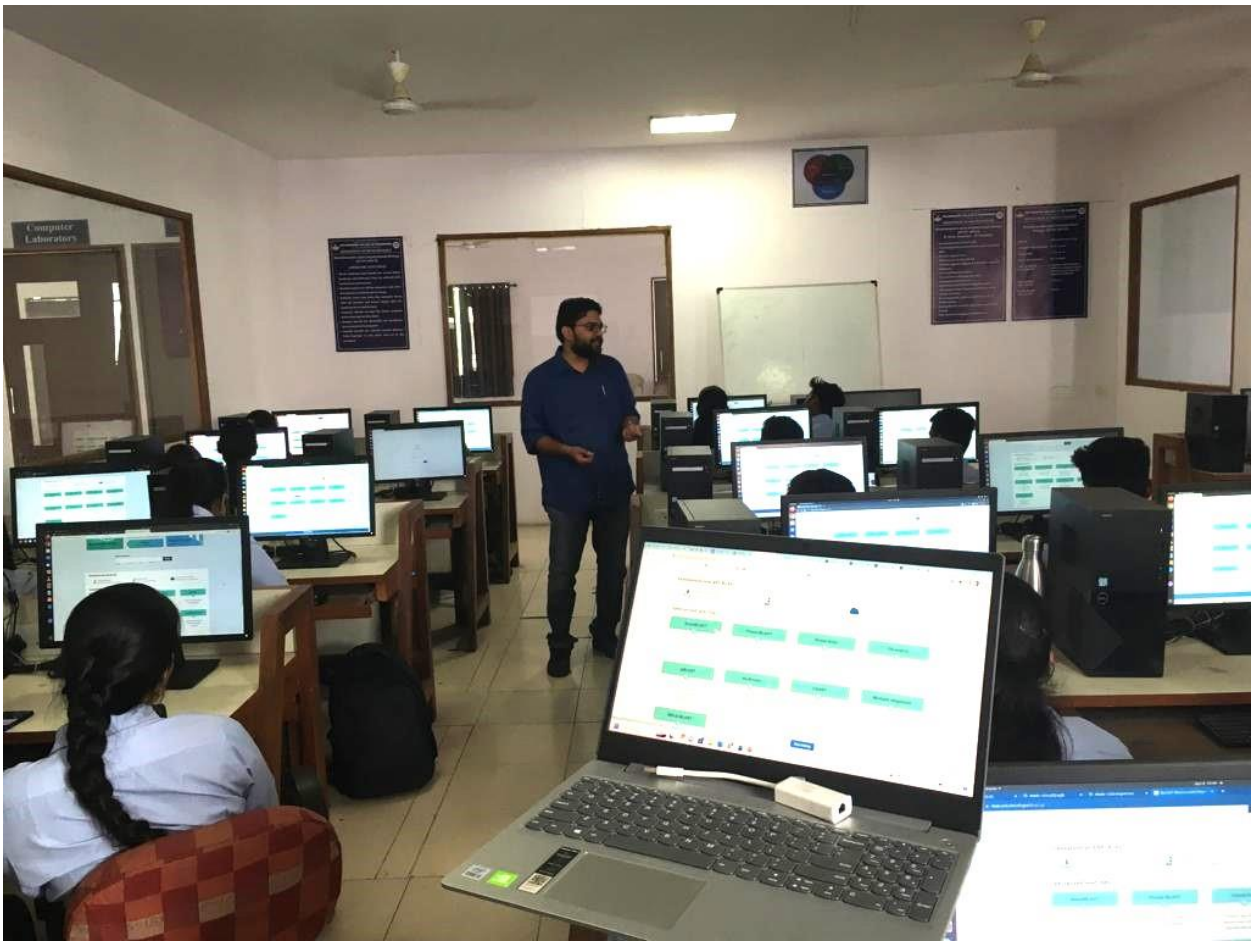

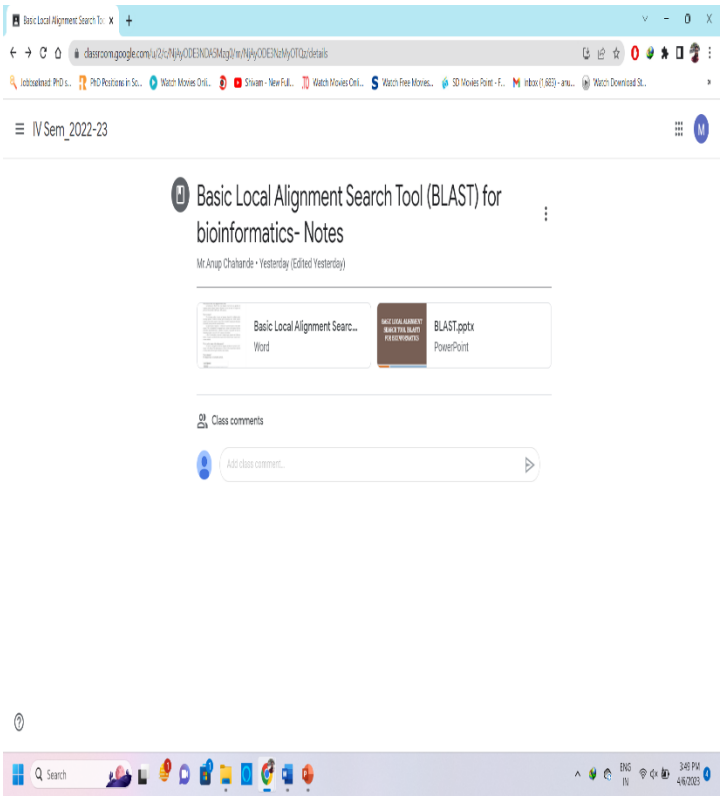

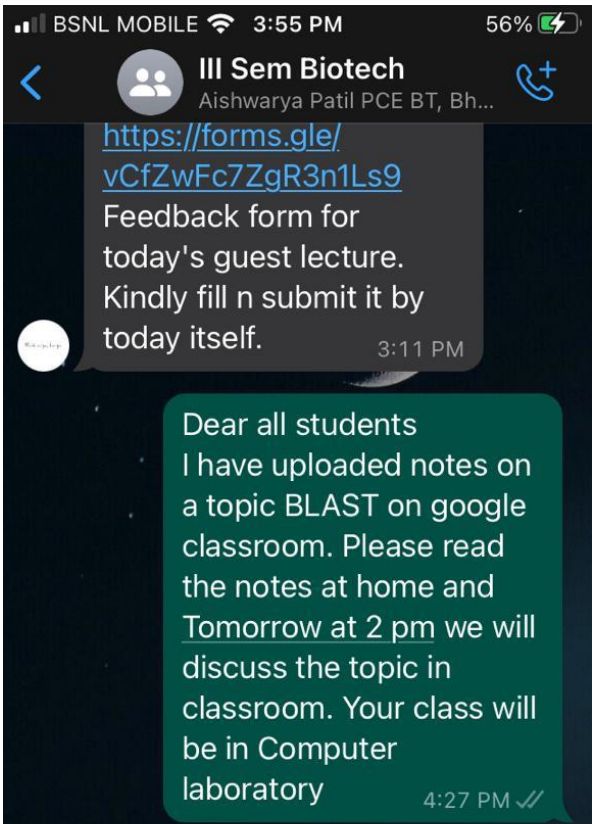

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Near CRPF Campus, Hingna Road, Nagpur-440 019, Maharashtra (India)

Virtual Lab

Dept Name : Biotechnology

Title of the Virtual lab practical: 1) Preparation of Competent Cell (Calcium Chloride Treatment)

Name of the Faculty: Mrs. Nisha A. Nikam

Virtual lab link: NPTEL Video https://nptel.ac.in/courses/102103013

Brief Description: virtual lab lecture link was shared with the VI Semester students which is on

1) Preparation of Competent Cell (Calcium Chloride Treatment) under Industrial Biotechnology/Genetic Engineering subject. The lecture is given by Dr. Utpal Bora, Dept. of Biotechnology IIT Guwahati

Number of Students Involved: 38

Outcome: Students got knowledge of Industrial Biotechnology/Genetic Engineering syllabus where they learnt about preparation of competent cells using calcium chloride treatment and transformation of host cells

Requirements if any for further betterment: NIL

Photograph (if any):

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NearCRPFCampus,HingnaRoad,Nagpur-440019,Maharashtra(India)

Virtual Lab

Dept Name : Biotechnology

Title of the Virtual lab Practical: Catalase and Coagulase Test

Name of the Faculty:Mrs. Latasha H. Taiwade

Virtual lab link:http://vlab.amrita.edu

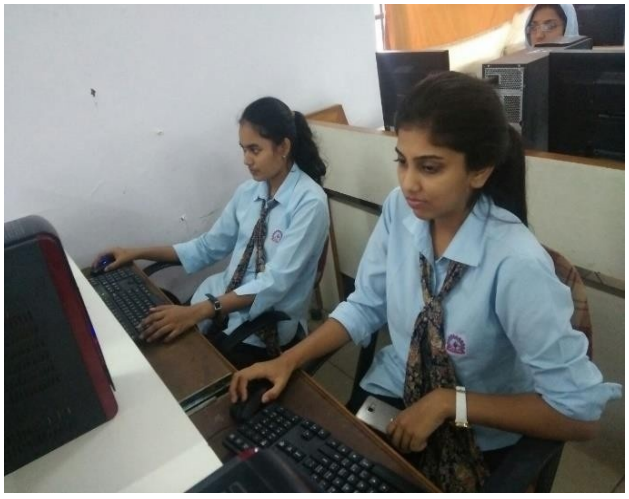
Brief Description: virtual lab lecture link was shared with the III Semester students which is Catalase and Coagulase Test in Microbiology laboratory. The lecture was conducted by Virtual lab of Amrita University.

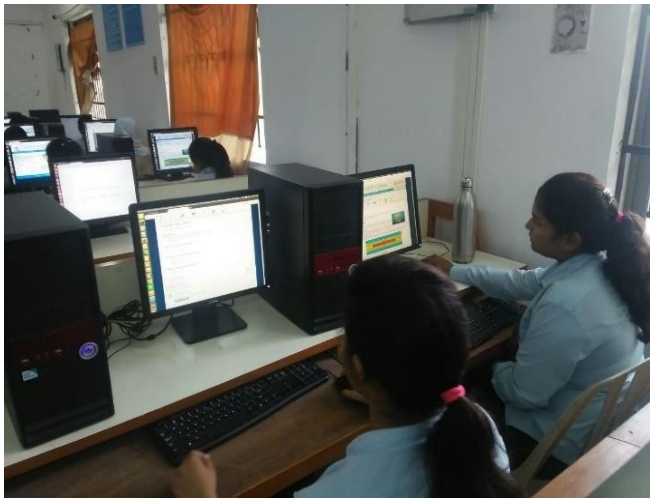
Number of Students Involved:38

Outcome: Students understand the concept of catalase enzyme Catalase is a common enzyme found in nearly all living organisms that are exposed to oxygen. During aerobic respiration, microorganisms produce hydrogen peroxide and, in some cases, an extremely toxic superoxide. Accumulation of these substances will result in death of the organism unless they can be enzymatically degraded.

Requirements if any for further betterment:NIL

Photograph(if any):





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NearCRPFCampus,HingnaRoad,Nagpur-440019,Maharashtra(India)

Virtual Lab

Dept Name : Biotechnology

Title of the Virtual lab Practical:Bacterial Growth Curve

Name of the Faculty:Mrs. Latasha H. Taiwade

Virtual lab link:http://vlab.amrita.edu

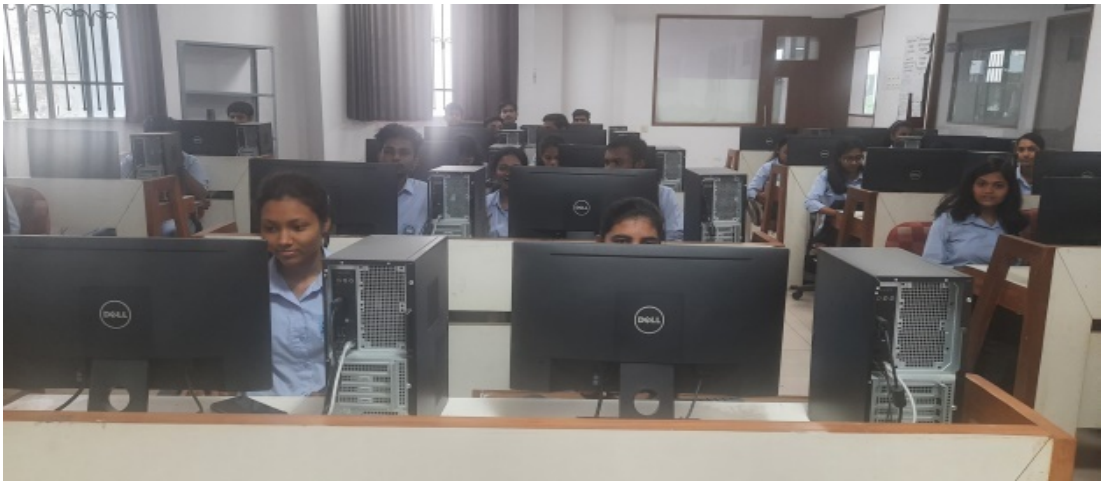
Brief Description: virtual lab lecture link was shared with the III Semester students which is Bacterial Growth Curve in Microbiology laboratory. The lecture was conducted by Virtual lab of Amrita University.

Number of Students Involved:38

Outcome: Students understand the concept of different growth stages of bacteria. All bacterial growth curves grown in cell culture in laboratory exhibit the same 4 following phases" the lag phase ,the log phase or exponential phase , the stationary phase and the death phase.

Requirements if any for further betterment:NIL

Photograph(if any):



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Virtual Lab

DeptName : Biotechnology

Title of the Virtual lab Practical: Antibiotic Susceptibility Testing

Name of the Faculty:Mrs. Latasha H. Taiwade

Virtual lab link:vlab.amrita.edu,. (2013). Antibiotic Susceptibility Testing. Retrieved 20 November 2022, from vlab.amrita.edu/?sub=3&brch=73&sim=1628&cnt=1

Brief Description: virtual lab lecture link was shared with the III Semester students which is Antibiotic Susceptibility Testingin Microbiology laboratory. The lecture was conducted by Virtual lab of Amrita University.

Number of Students Involved: 36

Outcome: Students got the knowledge about the characteristic of bacterial sensitivity regarding different antibiotics. They could understand the concept and importance of antibiotic sensitivity in microbial testing.

Requirements if any for further betterment:NIL

Photograph(if any):

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Virtual Lab

Subject: Immunology and Immunotechnology

Dept Name : Biotechnology

Title of the Virtual lab Practical: Latex Agglutination

Name of the Faculty:Mrs. Latasha H. Taiwade

Virtual lab link:vlab.amrita.edu,. (2011). Latex Agglutination. Retrieved 20 November 2022, from vlab.amrita.edu/?sub=3&brch=69&sim=195&cnt=1

Brief Description: virtual lab lecture link was shared with the V Semester students which are on Latex Agglutination in Immunology and immunotechnology laboratory. The lecture was conducted by Virtual lab of Amrita University.

Number of Students Involved:25

Outcome: Students got the knowledge about the to detect the presence of an antigen in a sample through agglutination method and its application in medicine as a diagnostic tool.

Requirements if any for further betterment:NIL

Photograph(if any):

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Virtual Lab

Dept Name: Biotechnology

Title of the Innovation in TL Process: Cell and Molecular Biology.

Name of the Faculty: Dr.A.P.Kopulwar

ICT Tools Used: Virtual Laboratory

Other Resources used:

Brief Description: Cell and molecular biology is wet lab work is very important. But dry lab work also improvises the modern tools which is not performed by the students.
Virtual Lab experiments are very well explained and

Number of Students Involved: 25

Outcome: Students were able to perform the experiment with different parameters.
Requirements if any for further betterment

Photograph (if any)