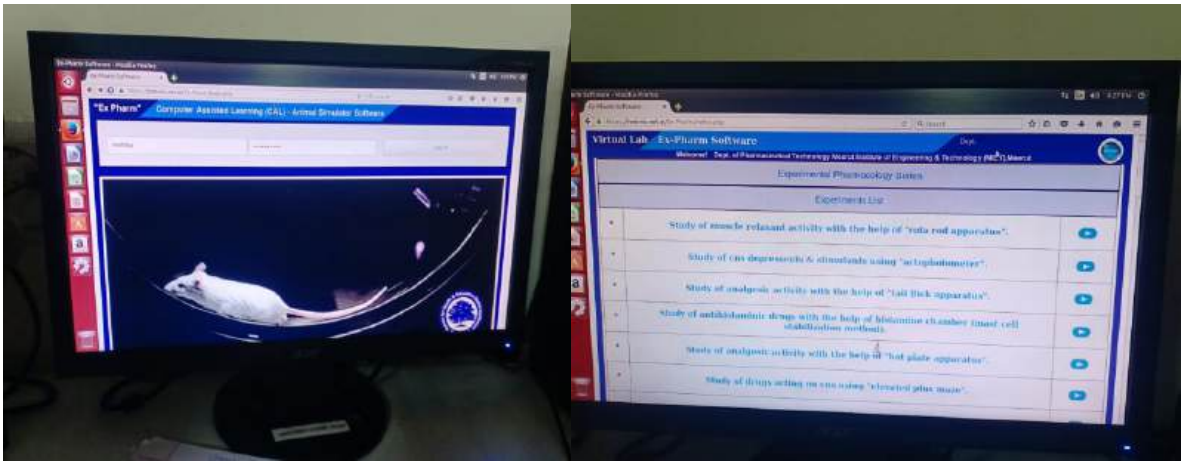
Innovations by the Faculty in Teaching and Learning

Best Practices in teaching learning followed by Department:

- **Demonstration using standard software and Simulation Tools**

The institute ensures effective integration of software tools to enhance the teaching–learning process in pharmaceutical sciences. The software **Ex Pharm** is regularly utilized across different semesters by faculty members for experimental and practical learning support. The usage is well-documented and spread across multiple courses and faculty members, thereby ensuring continuity and uniformity in student exposure.



➢ During the academic session **2024–25**, ***Ex Pharm*** was used in the following manner:

- In **II Year / IV Semester**, the software was employed by **Ms. Falguni Goel, Ms. Kanika Tyagi, and Mr. Angesh Kumar** to demonstrate and simulate pharmacological experiments. This enabled students to gain conceptual clarity where live animal experimentation is restricted due to ethical concerns.
- In **III Year / V Semester**, **Ms. Archana Adhana and Ms. Mansi Verma** used the software to reinforce experimental pharmacology concepts and facilitate better visualization of pharmacodynamic and pharmacokinetic principles.
- In **III Year / VI Semester**, the software was integrated into teaching by **Dr. Vrish Dhwaj Ashwlayan** and **Ms. Archana Adhana**, providing students with advanced exposure to simulated experiments aligned with the curriculum requirements.

SI.No.	Name of Sotware	Used by	Used in (Year/Sem)	Session
1	Ex Pharm	Ms. Falguni Goel	II/IV	2024-25
2	Ex Pharm	Ms. Kanika Tyagi	II/IV	2024-25
3	Ex Pharm	Mr.Angesh Kumar	II/IV	2024-25
4	Ex Pharm	Ms. Archana Adhana	III/V	2024-25
5	Ex Pharm	Ms. Mansi Verma	III/V	2024-25
6	Ex Pharm	Dr. Vrish Dhwaj Ashwlayan	III/VI	2024-25
7	Ex Pharm	Ms. Archana Adhana	III/VI	2024-25

LIST OF PRACTICALS
MEERUT INSTITUTE OF ENGINEERING AND TECHNOLOGY, MEERUT
Department of Pharmaceutical Technology

Pharmacology-I (BP-408P)

S. No.	Experiment Name
1	Introduction to experimental pharmacology
2	Commonly used instruments in experimental pharmacology
3	Study of common laboratory animals
4	CPCSEA guidelines for laboratory animal facility
5	Common laboratory techniques: Blood withdrawal, serum and plasma separation, anesthetics and euthanasia
6	Study of different routes of drug administration in mice/rats
7	Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice
8	Effect of drugs on ciliary motility of frog oesophagus
9	Effect of drugs on rabbit eye
10	Effects of skeletal muscle relaxants using rota-rod apparatus

MEERUT INSTITUTE OF ENGINEERING AND TECHNOLOGY, MEERUT
Department of Pharmaceutical Technology

Programme: - B. Pharmacy **Semester: - Odd V**
Course: - Pharmacology II - Practical **Code:-BP507P**

List of Experiments

1. To study introduction to *in-vitro* pharmacology and physiological salt solutions. **(CO-1)**
2. To demonstrate the effect of drugs on isolated frog heart by softwares and videos. **(CO-3)**
3. To record the effect of drugs on blood pressure and heart rate of dog using softwares and videos. **(CO-3)**
4. To demonstrate the diuretic activity of drugs on rats/mice. **(CO-3)**
5. To examine Dose Response Curve (DRC) of acetylcholine using frog rectus abdominis muscle and softwares / videos. **(CO-4)**
6. To determine the effect of physostigmine on Dose Response Curve (DRC) of acetylcholine using frog rectus abdominis muscle and softwares / videos. **(CO-4)**
7. To execute the effect of atropine on Dose Response Curve (DRC) of acetylcholine using rat ileum and softwares / videos. **(CO-4)**
8. To report the bioassay of histamine using guinea-pig ileum and softwares / videos by matching method. **(CO-2)**
9. To explain the bioassay of oxytocin using rat uterine horn and softwares / videos by interpolation method. **(CO-2)**
10. To report the bioassay of serotonin using rat fundus strip and softwares / videos by three point bioassay. **(CO-2)**
11. To describe bioassay of acetylcholine using rat ileum/colon and softwares/ videos by four point bioassay **(CO-2)**
12. To demonstrate pA_2 value of prazosin using rat anococcygeus muscle and softwares / videos by Schilds plot method. **(CO-3)**
13. To record pD_2 value of histamine using guinea-pig ileum and softwares / videos. **(CO-3)**
14. To implement the effect of spasmogens and spasmolytics using rabbit jejunum and softwares / videos. **(CO-3)**
15. To evaluate the anti-inflammatory activity of drugs using carrageenan induced rat paw-oedema model and softwares / videos. **(CO-5)**
16. To appraise the analgesic activity of drug using central and peripheral methods by softwares and videos. **(CO-5)**

Practical beyond the Syllabus:

17. To study the preparation of different solutions, drug dilutions, use of molar and w/v solution in experimental pharmacology. **(CO-1)**

MEERUT INSTITUTE OF ENGINEERING AND TECHNOLOGY, MEERUT
Department of Pharmaceutical Technology

Pharmacology-III (Practical) (BP-608P)

S. No.	Practical
1.	To study dose calculation in pharmacological experiments. (CO1)
2.	To screen anti-allergic activity by mast cell stabilization assay demonstrated by simulated experiments/videos. (CO-2)
3.	To study anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDs induced ulcer model demonstrated by simulated experiments/videos. (CO3)
4.	To study of effect of drugs on gastrointestinal motility demonstrated by simulated experiments / videos. (CO-3)
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10.	To determine acute eye irritation / corrosion of a test substance demonstrated by simulated experiments/videos. (CO-4)
	Experiment (Beyond University Curriculum)
11.	To study Stereotaxic instrument for mouse in experimental pharmacology. (CO-3)
12.	To study the Langendorff apparatus. (CO 3)

➢ During the academic session **2023–24**, *Ex Pharm* was used in the following manner:

• In **II Year / IV Semester**, the software was used by **Dr. Vrish Dhwaj Ashwlayan, Dr. Nazia Siddiqui, and Mr. Angesh Kumar** to demonstrate core pharmacological experiments and help students visualize mechanisms of drug action.

- In **III Year / V Semester**, **Mr. Avnesh Kumar Singh and Ms. Aditi Giri** employed the software to supplement laboratory-based pharmacology sessions, thereby enhancing student understanding of experimental outcomes.

- In **III Year / VI Semester**, **Dr. Vrish Dhwaj Ashwlayan and Ms. Kanika Tyagi** utilized the software to conduct advanced simulation sessions aligned with curriculum requirements, bridging the gap between theory and applied pharmacology.

SI.No.	Name of Sotware	Used by	Used in (Year/Sem)	Session
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3	Ex Pharm	Mr.Angesh Kumar	II/IV	2023-24
4	Ex Pharm	Mr. Avnesh Kumar Singh	III/V	2023-24
5	Ex Pharm	Ms. Aditi Giri	III/V	2023-24
6	Ex Pharm	Dr. Vrish Dhwaj Ashwlayan	III/VI	2023-24
7	Ex Pharm	Ms. Kanika Tyagi	III/VI	2023-24

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Department of Pharmaceutical Technology

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MEERUT INSTITUTE OF ENGINEERING AND TECHNOLOGY, MEERUT
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- During the academic session **2022–23**, ***Ex Pharm*** was used in the following manner:

- **II Year / IV Semester:** ***Dr. Vrish Dhwaj Ashwlayan, Dr. Nazia Siddiqui, and Mr. Angesh Kumar*** used ***Ex Pharm*** to demonstrate core pharmacological experiments, enabling students to visualize drug action where live animal studies are restricted.
- **III Year / V Semester:** ***Mr. Avnesh Kumar Singh*** employed the software to supplement practical sessions and strengthen students' ability to interpret experimental outcomes.
- **III Year / VI Semester:** ***Dr. Vrish Dhwaj Ashwlayan*** used the software for advanced simulations, connecting theoretical knowledge with applied pharmacological practices.

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Impact on Students' Learning:

1. Provided an ethical and simulation-based alternative to animal experimentation.
2. Improved conceptual clarity and visualization of pharmacological mechanisms.
3. Strengthened Outcome-Based Education (OBE) by enhancing both knowledge (cognitive domain) and practical application (psychomotor domain).
4. Ensured continuity of experiential learning across different semesters.

- **Collaborative Learning**

  In laboratories, students perform experiments in groups. This facilitates discussions among themselves and improves their subject understanding. The similar practice is being followed in Project groups wherein a group of students is assigned projects. Under this, students solve a common problem together, under the supervision of assigned mentors. They evaluate, analyze, design /create the models which are evaluated by internally and externally.

- **Turning conventional into exceptional**

  In many of the events, students take a lead role. One of the examples includes Innovation competition during the pharmacist day celebration. In this event, students start from the thinking about idea and generate ideas for developing innovative designs and convert these ideas into reality.

Meerut Mahotsav started with a bash with a very new and young minds attracted to make their own world in startup ideas. The Department of pharmaceutical technology got a chance to showcase these young minds soap making, lip balm making, wine making process and the importance of vitals of patients.

SI.No.	Name of faculty and students	Product Name	Event
1	Mr. Kartik Sharma (Faculty) & Mr. Sahil, Mr. Nihal, Ms. Bhumi & Ms. Akansha, Ms. Apurva (Students IV	Liquid Detergent, Liquid Dishwash, Liquid Floor cleaner, Black Phenyl	World Pharmacist Day 2024

	year)		
2.	Mr. Kartik Sharma (Faculty) & Mr. Sagar, Mr. Ayush, Ms. Khusi, Mr. Varisth (Students IV year)	Anti-oxidant cream, Skin Toning cream, Day cream	World Pharmacist Day 2024
3	Dr. Ankit kumar, Ms. Vishi Khattri, Ms. Archana Adhana (Faculty) & Mr. Sahil, Mr. Nihal, Mr. Varisth, Ms. Bhumi & Ms. Akansha (Students IV year) & Mr. Abhishek, Mr. Dhruv (Students III year) & Ms. Suhani (Student II year)	Lip balm, Soap, Wine	Nature's workshop in "Meerut Mahotsav" 2024
4	Mr. Kartik Sharma (Faculty) & Mr. Sahil, Mr. Nihal, Ms. Bhumi & Ms. Akansha, Ms. Apurva (Students IV year)	Under Eye Patches	Project Expo.2024
5	Dr. Anita Singh (Faculty) & Mr. Sagar (Student IV year)	Diaper Rashes gel	Project Expo.2024

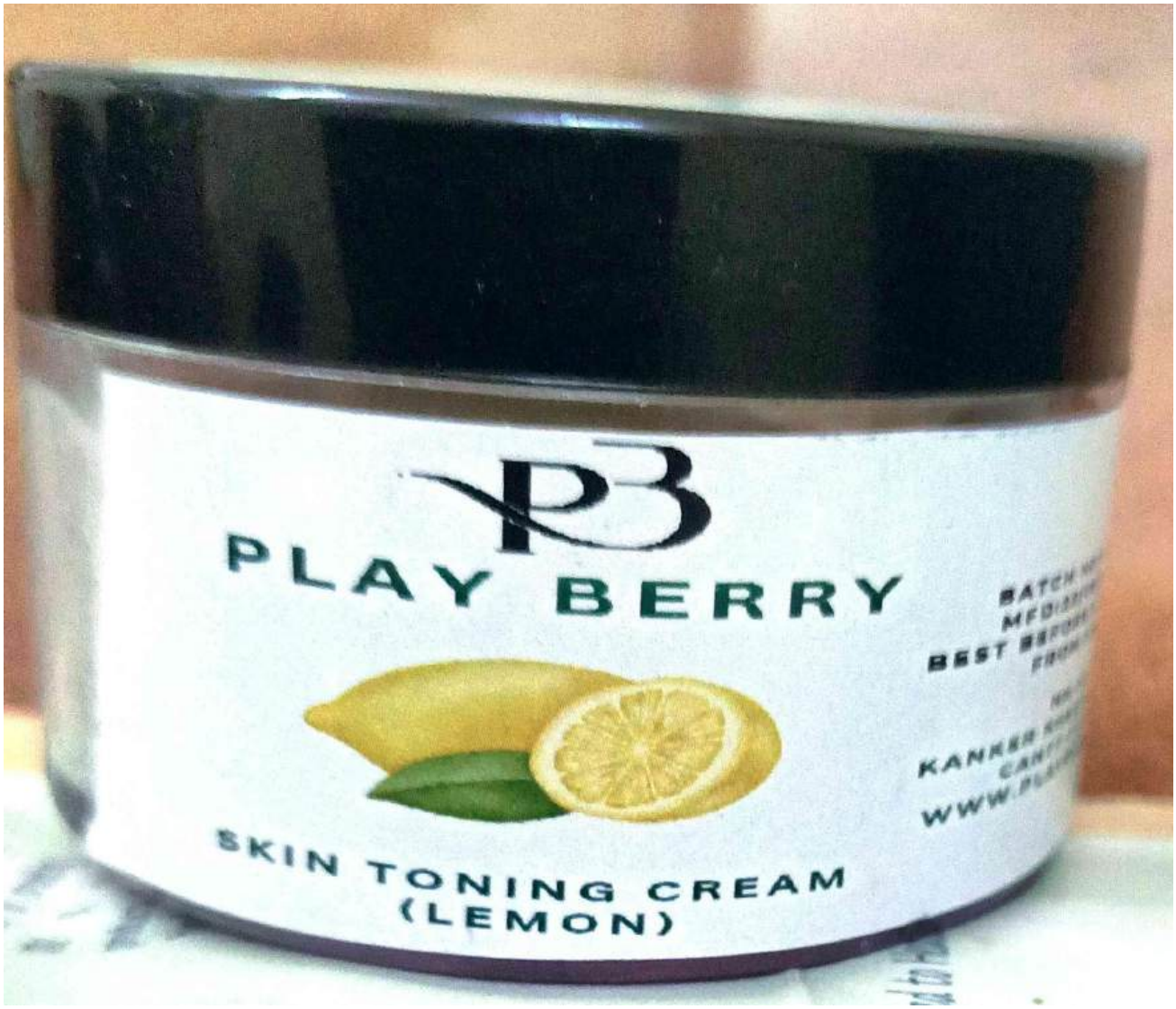
Photographs of Deveoped Products:

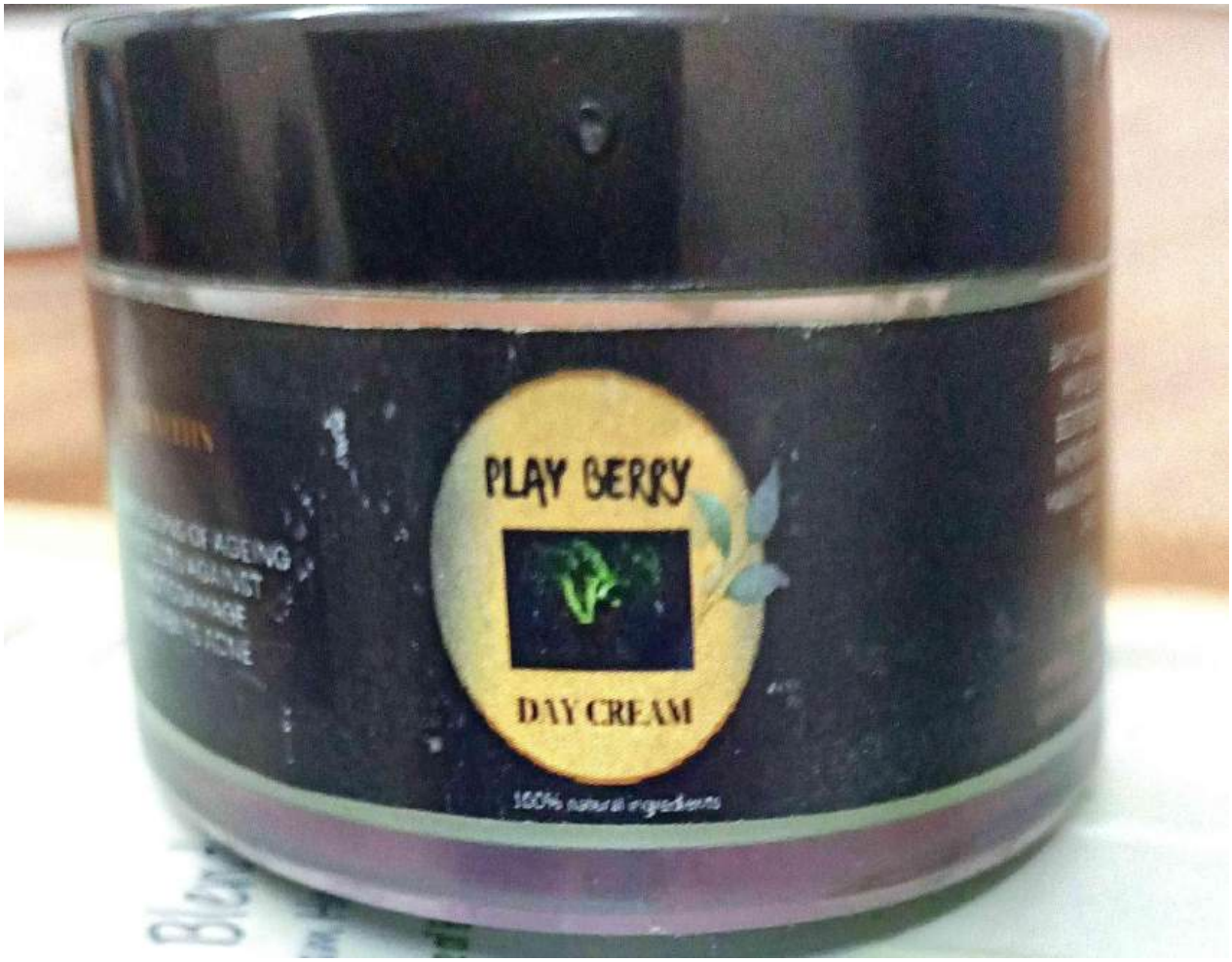

miet
PHARMA MAVERICKS
DISH WASHER
Noorani
250ml


Miet
PHARMA MAVERICKS
FLOOR
CLEANER
Rose
250ml


miet
PHARMA MAVERICKS
BLACK
PHENYL
250ml


PB
PLAY BERRY
ANTI OXIDANT
CREAM
(ORANGE)


PB
PLAY BERRY
SKIN TONING CREAM
(LEMON)


PLAY BERRY
DAY CREAM


NATURE'S
WORKSHOP
"Crafting Wonders, Naturally"
21-25 DECEMBER 2024
AAROGYAM
SOAP MAKING
LIP BALM MAKING
WINE MAKING PROCESS


KING
WINE PREPARA
miet
Lip Balm
Soaps


miet
Meerut Foundation
NATURE'S WORKSHOP
SOAP MAKING
Preparation of soap base & active ingredients
Pouring into
NATURE'S WORKSHOP
WINE PREPARATION
STEP-3
STEP-4
Lip Balm
Wine
Vitals

- **Brainstorming**
  Students are encouraged to brainstorm on different topics in the class. This enables weak students to understand the subject better and give other students a different viewpoint on the same topic.

SI. No.	Name of faculty	Subject Name	Year/Sem	Description
1	Dr. Vipin Kumar Garg	HAP-I	I/Odd	Brainstorming Questionnaire
2	Ms. Aditi Singhal	Pharmaceutics-I	I/Odd	Brainstorming Questionnaire
3	Dr. Anurag Chaudhary	Pharmaceutical Analysis	I/Odd	Brainstorming Questionnaire
4	Ms. Neha Sharma	Pharmaceutical Organic Chemistry II	II/Odd	Brainstorming Questionnaire
5	Ms. Falguni Goel	Pharmaceutical Microbiology	II/Odd	Brainstorming Questionnaire
6	Mr. Irfan ali	Medicinal Chemistry II – Theory	III/Odd	Brainstorming Questionnaire
7	Ms. Pooja Yadav	Industrial Pharmacy I	III/Odd	Brainstorming Questionnaire
8	Dr. Alimuddin Saifi	Pharmacognosy and Phytochemistry	III/Odd	Brainstorming Questionnaire
9	Mr. Saurabh Singh	Instrumental Methods of Analysis	IV/Odd	Brainstorming Questionnaire
10	Ms. Lalita Tyagi	Novel Drug Delivery S ystem (NDDS)	IV/Odd	Brainstorming Questionnaire
11	Dr. Vipin Kumar Garg	Human Anatomy and Physiology II	II/Even	Brainstorming Questionnaire
12	Dr. Vrish Dhwaj Ashwlayan	Pathophysiology	II/Even	Brainstorming Questionnaire
13	Ms. Vishi Khattri	Physical Pharmaceutics II –	II/Even	Brainstorming Questionnaire
14	Dr. Alimuddin Saifi	Pharmacognosy I	II/Even	Brainstorming Questionnaire
15	Dr. Irfan ali	Medicinal Chemistry III	III/Even	Brainstorming Questionnaire
16	Ms. Archana Adhana	Pharmacology III	III/Even	Brainstorming Questionnaire
17	Ms. Lalita Tyagi	Biostatistics and Research Methodology	IV/Even	Brainstorming Questionnaire
18	Mr. Angesh Kumar	Social and Preventive Pharmacy	IV/Even	Brainstorming Questionnaire

- **Online Audio/Video lectures**
  It is encouraged to cover important subjects and topics through online lectures by subject experts. An example is the coverage of the all Pharma subjects through AKTU **MOOC**s lecture series delivered by various subject experts from reputed colleges and universities.

- **Focused group study**
  Students are divided into specific groups and are assigned specific topics related to curricular learning. These groups study the topics in detail through library books, internet, and library journals.

Thereafter, the topics are discussed by individual groups in the class and the teacher further guides them about the specific topic. The group's composition and the group discussion should be carefully planned to create a nonthreatening environment, so that participants feel free to talk openly and give honest opinions. Since participants are actively encouraged to not only express their own opinions, but also respond to other members and questions posed by the leader, focus groups offer a depth and variety to the discussion. Additionally, because focus groups are structured and directed, but also expressive, they can yield a lot of information in a relatively short time.

- **Interactive classrooms to facilitate spot learning**
  Students don't sit and take notes anymore. They are interacting on mobile devices, tablets, and laptops during class. The lecture classroom turns into an active learning center with a lively forum for thought- provoking discussion, personalized learning, and engaging group activities. With the help of laptop and projector, the contents from the syllabus are explained to the students. The students thereafter are given a battery of questions to be answered on spot which facilitates better learning and understanding of the topic being taught.

- **Problem based learning - Student-directed learning**
  Attempts are made to create excitement in the classroom through posing problems related to the topic and finding solutions thereby presenting and learning the topic which ensures students do more than listening through active participation. For example, question may be presented for the students like 'What are the uses of computational techniques in drug designing? Such question compels students to take active participation in the class discussion and creates excitement among them. Innovations by the Faculty in teaching and learning shall be summarized as per the following description.

- **Motivational Talks for encouraging students towards Science and Technology**
  The **International Day of Women and Girls in Science**, observed on **February 11**, recognizes the critical role women and girls play in science, technology, engineering, and mathematics (STEM). Established by the **United Nations General Assembly in 2015**, this day aims to promote gender equality, highlight achievements of women in science, and encourage greater participation in STEM fields.

S. No.	Pedagogical Methods	Activity
1	**Method: SEMINAR**	Seminars Assignments generally relates to a group meeting where an faculty is guiding the student regarding an innovation, research idea which might prove helpful in their future leanings. https://drive.google.com/file/d/1kHX3lQ7LwiGzAI6cUAQJxvX4MwzK7aHt/view?usp=drive_link

2.	**Method: DEMONSTRATION THROUGH WORKING REAL MODEL**	https://drive.google.com/file/d/1pmB5SfziBf2BLRv7lI_DInsLd9efPKcN/view?usp=drive_link
3	**Method: On-site Industrial Learning** **A visit to CPHI/PMEC Pharma Expo where various industries displayed novel formulations and novel techniques and appliances used in drug discovery.**	**https://drive.google.com/file/d/1hMZj2JTYDNXeuaHHPqiFII7c_lLYdxXD/view?usp=drive_link** **https://drive.google.com/file/d/1st5bB9tICvr7zpq7UN4EDoOS_dNrBxes/view?usp=drive_link**
4	**Method: Simulation Tools:** **Various softwares are used to exempt the usage of animals in different practical of pharmacology subject.**	https://drive.google.com/drive/folders/1nJbrRlCFvZ8-vm-ASqjoDvDRQGxkz3sP?usp=drive_link