



5.6 Innovations by the Faculty in Teaching and Learning



Modern Pedagogical Approaches


The department of Biotechnology has embraced modern pedagogical approaches in our teaching-learning materials. Our resources incorporate a variety of innovative techniques, such as flipped classrooms, video lectures, hands on trainings etc., to enhance student understanding and retention. These materials are designed to align with the latest educational trends and equip our students with the skills and knowledge necessary to succeed in today's competitive world. The following are the samples of the modern pedagogical tools used by the faculty in their teaching-learning process.


ACADEMIC YEAR: 2023-2024



Sl. No	Name of the faculty	Topic and Course	Statement of Goals /Objectives	Methodologies used	Significance of Results	Reference photos/links	Outcome of the Teaching Methods
1	Dr. Tha. Thayumanavan	Food preservation techniques B19BTE50 1: Principles of Food Preservation . Year /Sem: III/V	Students will gain a deep understanding of various methods used to preserve food, ensuring its safety, quality, and extended shelf life. This knowledge will be invaluable for both personal and professional	Video Lecture	Video lectures effectively convey visual information like demonstrations of techniques, equipment usage, and visual examples of spoiled vs. preserved food.		Students were inspired to do projects on food preservation techniques.


		Date: 19.8.23 Hr: 7 & 21.8.23, Hr 6	applications, enabling them to make informed choices about food storage and preparation.				
2	Dr. A.S. Arun Prasad	Condensation phenomena B10BTT50 1-Heat and Mass Transfer operations Date: 4.8.23, Hr 6.	Understanding condensation phenomena allows students to comprehend the process by which water vapor transforms into liquid water, a fundamental natural phenomenon with significant implications in various fields, including meteorology, engineering, and environmental science.	Flipped classroom	Flipping the classroom shifts the focus of in-class time from passive listening to active learning activities like discussions, problem-solving, and hands-on experiments. This can significantly increase student engagement and motivation.		Students were able to perform effectively in exams through this innovative method of teaching.

3	Dr. Harish B.S.	Size exclusion chromatography B19BTT50 2- Bioprocess Technology Date: 02.04.24 Hr, 7	Students will understand the principles of size exclusion chromatography and its applications in separating molecules based on their size. Learning this topic will equip students with the knowledge to effectively use size exclusion chromatography for various analytical and purification tasks in fields like biochemistry, biotechnology, and pharmaceutical sciences.	Experiential/Hands on training	Hands-on experience allows students to grasp the theoretical concepts of size exclusion chromatography (SEC) more deeply. They can directly observe the separation process, understand the role of different components (column, mobile phase, sample), and visualize how molecular size influences elution time. This leads to a more intuitive and robust understanding compared to solely theoretical instruction.		Students were motivated to approach various industries for placements
4	Dr. N. Veerasekar	Waste water treatment B19BTE70 4 - Environmental Biotechnology Date:	Learning about waste water treatment empowers students to understand the critical role it plays in protecting public health and the environment. By	Peer group learning	Wastewater treatment is a crucial environmental issue. Peer learning can help students understand the real-world implications of their learning and develop solutions to		Students were motivated to approach various industries for internship.


		21.07.23, Hr: 2	acquiring knowledge in this field, students can contribute to sustainable water management practices and develop innovative solutions to address water pollution challenges		local environmental challenges.		
5	Dr. S. Gayathri Devi	Western Blotting B19BTT50 3-Western Blotting B19BTT50 3: Genetic Engineering Date: 21.07.23, Hr: 1.	Students will gain a comprehensive understanding of Western blotting, a fundamental technique used to detect and quantify specific proteins in biological samples. Learning Western blotting will equip students with the practical skills necessary for conducting protein analysis in various research and clinical settings.	ICT enabled video animation	Video demonstrations provide a dynamic and engaging way to learn intricate techniques like Western Blotting. Visual learners can grasp the step-by-step process more effectively than from static text or diagrams alone.		Students developed practical skills and hands on training on this topic.



6	Ms. Kamali ML	Examples of receptors B19BTT30 4- Cell Biology and Genetics Date: 06.09.23, Hr: 7	Students will gain a deeper understanding of how cells communicate and respond to their environment, leading to a better appreciation of biological processes such as signaling, development, and disease.	ICT enabled video animation	Video demonstrations can effectively visualize complex receptor structures and their interactions with ligands. This helps students understand abstract concepts like receptor activation, signal transduction pathways, and cellular responses more easily.		Students were able to perform effectively in exams through this innovative method of teaching.
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7	Ms. R. Subashini	<p>Traditional Tools in TQM B19MBT70 1-Total Quality Management</p> <p>Date: 23.8.23, Hr 7 and 24.8.23, Hr: 1.</p>	<p>Learning traditional tools in total quality management equips students with a foundational understanding of quality principles and practices. These tools provide a structured framework for identifying and addressing quality issues, leading to improved process efficiency, reduced defects, and enhanced customer satisfaction.</p>	Exploratory Learning	<p>Students gain hands-on experience with TQM tools like process mapping, root cause analysis data collection and analysis, and control charts.</p>		<p>Students were able to improve their skills in combating industry related issues.</p>
8	Ms. J. Mohanapriya	<p>Biodiversity B19BTT70 1-Bioethics, Biosafety and IPR</p> <p>Date: 07.07.23, Hr 1.</p>	<p>Learning about biodiversity provides students with a deep understanding of the interconnectedness of life on Earth. This knowledge equips them with the ability to appreciate the importance of</p>	Experiential learning	<p>Experiential learning fosters a deeper understanding of ecological concepts compared to traditional lectures.</p>		<p>Students were able to perform effectively in exams through this innovative method of teaching.</p>


			preserving biological diversity, combating environmental challenges, and promoting sustainable practices for a healthier planet.			
9	Dr. Deblina Bharadwaj	Conformational isomerism B19BTT30 3-Bio Organic Chemistry Date: 20.09.23, Hr: 5.	By studying conformational isomerism, students gain a deep understanding of how molecules can rotate around single bonds to adopt different spatial arrangements without breaking any chemical bonds. This knowledge is crucial for understanding the properties, reactivity, and stability of molecules in various fields, including Bio organic chemistry.	Project-based learning	By designing projects, building models, or conducting experiments, students develop a deeper understanding of molecular structures, 3D representations, and the impact of structural variations on properties.	 <p>Students were able to perform effectively in exams through this innovative method of teaching.</p>


ACADEMIC YEAR: 2022-2023



Sl. No .	Name of the faculty	Topic and Course Name	Statement of Goals /Objectives	Meth odologies used	Significance of Results	Reference photos	Outcome of the Teaching Methods
1.	Dr. Tha. Thayumanavan	Management of solid waste disposal. B19BTE804: Marine Biotechnology Date: 10.3.23, Hr: 4.	The objectives of learning solid waste management are to understand the environmental and health impacts of improper waste disposal, and to develop effective strategies for reducing, reusing, recycling, and safely disposing of waste materials to protect public health and the environment.	Flipped classroom	Flipped classroom method helps student understanding of waste management concepts and promoting sustainable practices.		Students were inspired to do projects on solid waste management.

2.	Dr. Harish B.S.	Batch Fermentation B19BTT502-Bioprocess Technology Date: 26.07.23, Hr: 5	The objective of learning this topic is to gain knowledge about the different types of batch fermentation and their applications.	Experiential /Hands on training	Results from hands-on experiments provide tangible evidence of students' grasp of theoretical concepts and their ability to apply them in a practical setting.		Students were motivated to projects on fermentation techniques and also approach various industries for placements
4	Dr. N. Veerasekar	Industrial applications of enzymes. B19BTT403-Enzymology and Enzyme Technology. Date: 18.03.24, Hr: 1.	The objectives of learning about the industrial applications of enzymes are to understand the various ways in which enzymes are used in industrial processes, and to appreciate their potential for developing more sustainable and efficient technologies.	Group Discussion	Group discussions encourage students to critically analyze different perspectives on enzyme applications, leading to deeper understanding and improved problem-solving skills.		Students were motivated to approach various industries for internship and Placement.
5	Dr. S.	Transcription	The objectives of	ICT	Visual representations		Students were

	<p>Gayathri Devi</p>	<p>in Prokaryotes and Eukaryotes B19BTT402- Molecular Biology. Date: 17.02.23, Hr: 2 & 22.02.23, Hr: 3.</p>	<p>learning the transcription process are to understand the mechanisms by which genetic information encoded in DNA is transferred to RNA, and to appreciate the significance of this process in gene expression and cellular function.</p>	<p>enabled video animation</p>	<p>of the complex molecular machinery involved in transcription can significantly improve student understanding of the process and its key steps.</p>		<p>able to perform effectively in exams through this innovative method of teaching.</p>
<p>6.</p>	<p>Ms. Kamali ML</p>	<p>Instrumentation for molecular diagnosis B19BTT702: Biopharmaceutical Technology. Date: 03.09.22, Hr:5.</p>	<p>The objectives of learning the applications of the mutation process are to understand how mutations, while often harmful, can also be beneficial in various fields, such as medicine, agriculture, and biotechnology, and to explore the ethical considerations.</p>	<p>ICT enabled video animation</p>	<p>Animations can effectively illustrate the impact of different types of mutations at the molecular level, making it easier to understand their potential applications in areas like disease treatment and crop improvement.</p>		<p>Students were able to perform effectively in exams through this innovative method of teaching.</p>

7.	Ms. R. Subashini	Application of informatics in genomics and proteomics B19BTT504-Bioinformatics. Date: 29.9.22, Hr: 1.	The objectives of learning the application of informatics in genomics and proteomics are to understand how computational tools and techniques are used to analyse and interpret massive datasets generated by these fields, enabling advancements in personalized medicine, drug discovery, and our understanding of biological systems.	ICT enabled video animation	Animations can effectively depict the visualization and analysis of large genomic and proteomic datasets, making complex concepts like gene expression patterns, protein interactions, and evolutionary relationships more understandable.		Students were motivated to approach various industries for internship and Placement.
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ACADEMIC YEAR: 2021-2022							
Sl. No .	Name of the faculty	Topic and Course Name	Statement of Goals /Objectives	Methodologies used	Significance of Results	Reference photos	Outcome of the Teaching Methods
1	Dr. Tha. Thayumanavan	Biopreservatives B19BTE501: Principles of Food Preservation	Learning about biopreservatives helps to understand the mechanisms by which natural or microbial-derived compounds inhibit microbial growth in food, and to evaluate their potential as safe and effective alternatives to synthetic preservatives in enhancing food safety and extending shelf life.	Collaborative Learning	Collaborative analysis of results encourages students to critically evaluate the effectiveness and safety of different biopreservatives, leading to a deeper understanding of their potential applications in the food industry.		Students were inspired to do projects on biopreservatives.

2	Dr. Harish B.S.	<p>Concept of residence time distribution in non-ideal reactors B19BTT601- Chemical Reaction Engineering Date: 29.03.22, Hr: 3.</p>	<p>The objective of learning this topic characterize how fluids move through reactors that deviate from the idealized plug flow and perfectly mixed conditions.</p>	<p>Experiential Learning</p>	<p>The practical understanding of the RTD concepts enable them to minimize the deviations from the ideality and effectively design and optimize bioreactors for improved process efficiency and product yield.</p>		<p>Students were motivated approach various industries for placements</p>
3	Ms. Kamali ML	<p>Respiratory diseases B19BTE609- Life style Diseases Date: 13.05.22, Hr: 1.</p>	<p>The goal of learning about respiratory diseases are to understand the causes, symptoms, and pathophysiology of various respiratory conditions.</p>	<p>Group Discussion</p>	<p>By discussing different perspectives on disease causes, symptoms, and treatment options, students develop critical thinking and problem-solving skills essential for understanding complex medical issues.</p>		<p>Students were able to perform effectively in exams through this innovative method of teaching.</p>