SEMESTER-IV

GANPAT UNIVERSITY									
FACULTY OF MANAGEMENT STUDIES									
Program	MBA		Branch/Spec.		MBA (Pharmaceuticals) Elective Subject				
Semester	IV				Version	1.0.0.0			
Effective from Academic Year		2025-26			Effective for the batch Admitted in		June 2025		
Subject code	**IVA01ADP**		Subject Name		**AI in Drug Discovery and Personalized Medicine**				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	0	0		2	Theory	100		100
Hours	2	0	0		30	Practical			

Objective:
To equip MBA students with a strategic framework to analyze and lead the integration of AI in the pharmaceutical and healthcare industries, focusing on its transformative impact on drug discovery and the commercialization of personalized medicine.

Course Outcome:
CO 1: The students will be able to explain the strategic shift from traditional to AI-driven R&D and the foundational role of "omics" data in modern healthcare.
CO 2: The students will be able to analyze the value chain of AI in drug discovery, from target identification to optimizing clinical trials.
CO 3: The students will be able to evaluate the commercial and strategic implications of AI in developing and launching personalized medicine and companion diagnostics.
CO 4: The students will be able to formulate a strategic framework for adopting AI in a biopharma context, considering business models, regulatory pathways, and ethical challenges.

Theory syllabus

Unit	Content	Hrs
1	Foundations of the AI Revolution in Pharma, The Pharma R&D Challenge: Cost, Time & Failure Rates, AI & Machine Learning: A Managerial Overview, Introduction to "Omics" Data: Genomics, Proteomics, The Synergy: How AI Unlocks Insights from Big Bio-Data, The Evolving Ecosystem: Big Pharma, AI Startups, CROs.	6
2	AI Applications Across the Drug Discovery Value Chain, AI in Pre-Clinical Research: Target Identification & Validation, Generative AI for de novo Drug Design, Predicting Drug Efficacy & Toxicity, AI-Powered Drug Repurposing Strategies, Optimizing Clinical Trials: Intelligent Patient Recruitment, Digital Biomarkers & Remote Trial Monitoring, Reducing Trial Timelines and Costs.	8
3	Personalized Medicine: From Lab to Market, AI for Patient Stratification & Subgroup Analysis, AI-Driven Biomarker Discovery, Companion Diagnostics (CDx): Strategy & Co-development, The Business of Real-World Evidence (RWE), Commercial Strategy: Pricing & Reimbursement for Targeted Therapies, The Role of DTC Genomics (e.g., 23andMe) in Data Generation, Building a Go-to-Market	8

	Strategy for a Personalized Drug.	
4	Strategic, Regulatory, and Ethical Frontiers, Business Models: In-House AI, Partnerships, M&A, The Pharma-AI Investment & Venture Capital Landscape, Regulatory Pathways for AI-Driven Therapeutics (FDA, EMA), "Software as a Medical Device" (SaMD) Overview, Intellectual Property (IP) for AI-Discovered Molecules, Data Governance, Privacy, and Security in Healthcare, Ethical AI: Addressing Algorithmic Bias & Consent.	8
Practical content		
Reference Books		
1.	Topol, Eric. Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again. Basic Books, 2019.	
2.	Iansiti, Marco, and Lakhani, Karim R. Competing in the Age of AI: Strategy and Leadership When Algorithms and Networks Run the World. Harvard Business Review Press, 2020.	
3.	Mukherjee, Siddhartha. The Emperor of All Maladies: A Biography of Cancer. Scribner, 2010.	
4.	Agrawal, Ajay, et al. Prediction Machines: The Simple Economics of Artificial Intelligence. Harvard Business Review Press, 2018.	
5.	Davenport, Thomas H., and Kalakota, Ravi. The AI Advantage: How to Put the Artificial Intelligence Revolution to Work. MIT Press, 2019.	
6.	Ginsburg, Geoffrey S., and Willard, Huntington F. Genomic and Personalized Medicine. 2nd Edition, Academic Press, 2012.	
7.	Ross, Jeanne W., et al. Designed for Digital: How to Architect Your Business for Sustained Success. MIT Press, 2019.	
8.	O'Neil, Cathy. Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy. Crown, 2016.	
9.	Ching, Travers, et al. "Opportunities and obstacles for deep learning in biology and medicine". Journal of The Royal Society Interface, 2018.	
10.	Kumar, V., and Reinartz, Werner. Customer Relationship Management: Concept, Strategy, and Tools. 3rd Edition, Springer, 2018. (For patient centricity concepts).	
11.	World Health Organization. Ethics and governance of artificial intelligence for health. WHO, 2021.	
12.	Pisano, Gary P. Science Business: The Promise, the Reality, and the Future of Biotech. Harvard Business Press, 2006.	
13	Tegmark, Max. Life 3.0: Being Human in the Age of Artificial Intelligence. Vintage, 2018.	