GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology	Branch/Spec.	Computer Engineering/ Information Technology/ Computer Engineering(Artificial Intelligence)
Semester	VIII	Version	1.0.0.0
Effective from Academic Year	2024-25	Effective for the Batch admitted in	July 2022
Course Code	2CEIT8PE4	Course Name	AI in Healthcare

Teaching Scheme						Examination Scheme (Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	-	1	-	3	Theory	40	60	100
Hours	2	-	2	-	4	Practical	30	20	50

Pre-requisites

NA

Course Outcomes

On successful completion of the course, the students will be able to:

CO1	Explain the fundamental concepts of AI-based decision support systems and their role in the healthcare ecosystem.
CO2	Apply methods and techniques to analyze healthcare challenges using case studies and automated systems.
CO3	Analyze opportunities and trends in the healthcare industry using predictive analytics and decision support systems.
CO4	Design advanced AI solutions integrating NLP, computer vision, and drug discovery systems for healthcare applications.

Theory Syllabus

Unit	Content	Hrs.
1	**Fundamentals of AI in Healthcare and Medical Data Management:** History of AI in Medicine, AI for Decision Support, Capabilities and limitations of AI in Healthcare, Automated healthcare system: challenges and opportunities, Biostatistics, Research ethics in AI, Common healthcare data types, Medical data: quality vs quantity, Clinical Data, Clinical decision support systems, Electronic Health Records (EHR).	06
2	**Healthcare Data Analysis and Clinical Decision Support:** Time series and non-time series data, Data Sourcing, Data Enrichment, Handling missing values, Advantages and challenges in observational data, Geographic and demographic variation in medical Data, Classification, regression, clustering for healthcare, Evaluation measures for healthcare applications, Bias and Error in medical data, Analysis of data from IOT body sensors, Automated diagnosis processes, Treatment protocol development.	08
3	**Medical Imaging and Predictive Analytics in Healthcare:** Predictive modeling, Disease prediction, Early detection, Cancer detection using tabular data, Risk estimation in medical insurance, Medical Imaging, MRI, CT scan, X-Ray, 3D CNN, Biomedical signals, Large scale medical image retrieval, Handling hyper-dimensional medical images, Electronic phenotyping, Rule based phenotyping, Probabilistic phenotyping, DNA phenotyping, Multimodal data analysis, Regression analysis for Patient Monitoring and Preventive Screening.	09
4	**Natural Language Processing and Advanced Applications in Healthcare:** Clinical text, Medical Word Corpus, Text representation, BERT for medical data, PubMed BERT, Question answering systems, Finding similar patients through clustering, Medicine or treatment recommender systems, Q&A systems for Telemedicine, Personalized medicine recommendation system, Drug development analysis, Drug discovery, Modeling drug-drug interactions, Pandemic spread prediction, Infection pattern identification, Computer Vision systems for physiotherapy, Pose estimation, Gait Analysis.	07

Practical Content

Practicals, assignments and tutorials are based on the above syllabus.	
Text Books	
1	Artificial Intelligence in Healthcare by Adam Bohr and Kaveh Memarzadeh, Elsevier Science.
Reference Books	
1	Machine Learning and AI for Healthcare: Big Data for Improved Health Outcomes by Arjun Panesar, Apress.
ICT/MOOCs Reference	
1	https://www.coursera.org/specializations/ai-healthcare

Mapping of CO with PO and PSO:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	3	2	3	1	2	0	2	2	2	2
CO2	3	3	2	3	3	2	0	2	2	2	1	2	3	2	3
CO3	2	3	2	3	3	2	0	2	2	3	1	2	2	3	3
CO4	3	3	3	3	3	2	0	2	3	3	2	2	3	3	3