GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Master of Technology	Branch/Spec.	Computer Engineering (Artificial Intelligence)
Semester	II	Version	1.0.0.0
Effective from Academic Year	2025-26	Effective for the Batch admitted in	July 2025
Course Code	3CEIT127	Course Name	AI in Healthcare AI and Finance

Teaching Scheme						Examination Scheme (Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	-	1	-	4	Theory	50	50	100
Hours	3	-	2	-	5	Practical	30	20	50

Pre-requisites

NA

Course Outcomes

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

CO1	Understand AI fundamentals and their relevance to the healthcare and finance domains.
CO2	Apply AI models and programming tools to analyze structured and unstructured healthcare/finance data.
CO3	Evaluate and design intelligent decision support systems for real-world applications in healthcare and finance.
CO4	Integrate advanced AI techniques (NLP, CV, Time-Series) with domain-specific applications for innovation.

Theory Syllabus

Unit	Content	Hrs.
1	**Foundations of AI (ML & DL) for Healthcare** Fundamentals of AI, Machine Learning, Deep Learning (non- tech explanation), Applications of AI in healthcare, Supervised vs. Unsupervised Learning, Key ML/DL algorithms walkthrough (Linear Regression, Decision Trees, Clustering, logistic regression, SVM, Neural Network (NN), Deep NN, Convolution NN, etc.), When to use what? (Healthcare use cases). **Healthcare Data & Clinical Big Data Analysis** Overview of EMR data, medical imaging data, histopathology images, physiological signals, genomics data, IoT data, Structure of Indian hospital data (practical exposure)	04
2	**AI Models & Predictive Analytics** Development / implementation and optimizations of ML models such as Logistic Regression, Random Forest, SVM, Neural Network, Example Case Studies Development / implementation and optimizations of DL models such as Convolution Neural Networks (CNN), Recurrent Neural Networks, Generative Adversarial Networks (GANs), Transformer for various tasks such as segmentation, classification, prediction, synthetic image generation. **Example Project Assignments Options** CNN model for segmentation of a pathology on medical images such as X-Ray, MRI, CT, etc. ML model for imaging-based diagnosis ML model for physiological signal-based diagnosis CNN model for diagnosis classification of images/disease Image Synthesis using GAN **AI Applications & Healthcare Automation** IoT sensors, data streams, real-time AI monitoring	08

	Case study: AI in diabetic foot ulcers, smart watches	
3	**The Financial Services Landscape**: FSI and Fintech Fundamentals Defining the Scope and Importance of FSI in the economy Overview of Key Segments Understanding the FSI Value Chain Introducing Fintech (Financial Technology) Fintech vs Traditional FSI **Success and Failure of Fintech Projects** AI in Fintech Technology Adoption Case Study Discussion: Shri Ram Temple - A Fintech Solution for Large Scale Projects **Introduction to Deep Learning** Neural Networks Basics Deep Learning (DL) Overview Risk Modeling with Neural Networks Implementing DL Models with Python Adapting Pre-trained Models for Applications Fine-tuning Pre-trained Models	09
4	**Natural Language Processing (NLP) in Finance-** **Introduction to NLP in Finance** Overview of NLP and its Applications in Finance Key NLP Techniques: Tokenization, Stemming, Lemmatization, Stopword Removal Word Embeddings (Word2Vec, GloVe, FastText) Introduction to Financial Text Data (Earnings Calls, News, SEC Filings) **Sentiment Analysis for Market Predictions** Sentiment Analysis: Lexicon-based vs ML-based approaches Fine-tuning Transformer Models (BERT, FinBERT) for Financial Sentiment Evaluating Sentiment Models (Accuracy, F1-Score)	03
5	**Fintech Regulations-** **Understanding the Fintech Regulatory Landscape in India** What is Fintech Regulation and Why it matters Regulatory Objectives: Consumer Protection, Risk Management, AML, KYC Role of RBI, SEBI, IRDAI, and MeitY in India Key Policies and Guidelines: RBI Digital Lending Guidelines; UPI Framework; Data Protection Bill (India); FATF Guidelines on Crypto Challenges in Regulating Emerging Tech: AI, Crypto, and BNPL **AI in RegTech: Automating Compliance and Monitoring** What is RegTech? How AI is Transforming Compliance Examples of AI in Regulatory Reporting (KYC/AML Automation, Fraud Detection) Case Study: How banks use AI to detect suspicious patterns Explainable AI and Regulatory Audits Bias, Fairness, and Compliance in AI Models Overview of Tools used in AI-powered RegTech Regulatory Risks with AI Models: Model Drift, Hallucination, Explainability	04
Practical Content		
Practical, assignments and tutorials are based on above syllabus.		
Text Books		
1	"Artificial Intelligence in Healthcare" by Adam Bohr and Kaveh Memarzadeh, Elsevier Science, 2020. ISBN 978-0128184387.	
Reference Books		

2	"Machine Learning and AI for Healthcare: Big Data for Improved Health Outcomes" by Arjun Panesar, Apress, 2019. ISBN 978-1484237984.
ICT/MOOCs Reference	
1	https://www.coursera.org/specializations/ai-healthcare
2	https://onlinecourses.nptel.ac.in/noc25_mg63

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