

<b>Semester: 4</b>	<b>Course No.: 401</b>	<b>Course Code: FTM208-2C</b> <b>Course Title: -Data Driven Fintech Analysis</b>
<b>Credits: 4</b>	<b>Course Category: MAJOR COURSE</b>	

**Course Outcomes: On successful completion of the course the learner will be able to**

<b>CO#</b>	<b>COGNITIVE ABILITIES</b>	<b>COURSE OUTCOMES</b>
<b>CO1</b>	<b>REMEMBERING</b>	Recall key concepts, terminology, statistical methods, machine learning algorithms, deep learning architectures, big data technologies, cloud platforms, ethical principles, and regulatory frameworks relevant to data-driven Fintech analysis.
<b>CO2</b>	<b>UNDERSTANDING</b>	Explain the fundamental principles of statistical analysis, machine learning, deep learning, big data processing, and cloud computing, and their application in understanding financial data and solving problems within the Fintech domain.
<b>CO3</b>	<b>APPLYING</b>	Utilize appropriate statistical techniques, machine learning algorithms, and tools to preprocess, analyse, and model various types of financial data for tasks such as risk assessment, fraud detection, algorithmic trading, customer segmentation, and market prediction.
<b>CO4</b>	<b>ANALYSING</b>	Examine and compare different statistical methods, machine learning models, and deep learning architectures in the context of specific Fintech problems, evaluating their strengths, weaknesses, and suitability for different types of financial data and business objectives.
<b>CO5</b>	<b>EVALUATING</b>	Assess the ethical implications and regulatory considerations associated with the application of data-driven techniques in Fintech, and evaluate the effectiveness and limitations of different analytical approaches in addressing real-world financial challenges while adhering to responsible data practices.

<b>Unit No.</b>	<b>Unit Contents</b>	<b>Sessions Allotted</b>
<b>1</b>	Introduction to Data-Driven Fintech <ul style="list-style-type: none"> <li>• Overview of Fintech and its disruption of traditional finance</li> <li>• The importance of data in Fintech</li> <li>• Types of financial data and their characteristics</li> <li>• Data sources for Fintech analysis (market data, transaction data, social media data, etc.)</li> <li>• Data sources and acquisition (APIs, databases, web scraping)</li> <li>• Data cleaning and preprocessing for financial analysis</li> <li>• Basic statistical concepts for financial data analysis (descriptive statistics, probability distributions)</li> </ul>	<b>18</b>
<b>2</b>	Statistical Analysis for Fintech Applications in Fintech <ul style="list-style-type: none"> <li>- Risk measurement</li> <li>- Portfolio optimization</li> <li>- Credit risk modelling</li> </ul>	<b>12</b>
<b>3</b>	Machine Learning for Fintech <ul style="list-style-type: none"> <li>• Supervised learning techniques               <ul style="list-style-type: none"> <li>- Linear regression, logistic regression, decision trees, random forests, support vector machines</li> </ul> </li> <li>• Unsupervised learning techniques               <ul style="list-style-type: none"> <li>- Clustering, dimensionality reduction</li> </ul> </li> </ul>	<b>15</b>

	<ul style="list-style-type: none"> <li>• Applications in Fintech <ul style="list-style-type: none"> <li>- Fraud detection</li> <li>- Algorithmic trading</li> <li>- Customer segmentation</li> </ul> </li> </ul>	
<b>4</b>	<p>Deep Learning for Fintech</p> <ul style="list-style-type: none"> <li>• Introduction to neural networks</li> <li>• Deep learning architectures <ul style="list-style-type: none"> <li>- Multilayer perceptrons, convolutional neural networks, recurrent neural networks</li> </ul> </li> <li>• Applications in Fintech <ul style="list-style-type: none"> <li>- Natural language processing for sentiment analysis</li> <li>- Image recognition for fraud prevention</li> <li>- Time series forecasting for market prediction</li> </ul> </li> </ul>	15

**Suggested Text Books:**

1. "Python for Data Analysis" by Wes McKinney (O'Reilly, Latest Edition)
2. "Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow" by Aurélien Géron (O'Reilly, Latest Edition)
3. "An Introduction to Statistical Learning" by Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani (Springer, Latest Edition)
4. "Deep Learning" by Ian Goodfellow, Yoshua Bengio, and Aaron Courville (MIT Press, 2016)

**Suggested Reference Books:**

- "Data Science from Scratch: First Principles with Python" by Joel Grus (O'Reilly, Latest Edition)
- "Practical Statistics for Data Scientists" by Peter Bruce, Andrew Bruce, and Peter Gedeck (O'Reilly, Latest Edition)
- "Hadoop: The Definitive Guide" by Tom White (O'Reilly, Latest Edition)
- "Spark: The Definitive Guide" by Matei Zaharia, Bill Chambers (O'Reilly, Latest Edition)