1.	Title of the course	Data Stream Analytics
2.	Course number	CS517L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To CS5226/12
6.	To be offered by	Department of Computer Science and Engineering
7.	To take effect from	July 2022
8.	Prerequisite	CoT
9.	**Course Objective(s):** To impart knowledge on theoretical concepts and practical processes in analysis of streams of data. To impart knowledge on standard practices via industrial case studies and self-help exercises over state of the art software platforms.	
10.	**Course Content:** Time-series analysis: modelling using stochastic processes, stationarity, autocovariance function, autocorrelation, partial autocorrelation function; Classical approaches: AutoRegressive (AR), Moving Average (MA), integrated models, mixed models, seasonality, exogenous regressors, vector models, Akaike Information Criterion (AIC) for order selection, exponential smoothing; Spectral analysis; State space modeling of time series: Hidden Markov Model (HMM), Kalman filtering, nonlinear and multivariate time series analysis; Usage of deep learning: Multilayer Perceptron (MLP), Recurrent Neural Networks (RNN), Long Short-Term Memory (LSTM), Convolutional Neural Networks (CNN), auto encoder, hybrids; Industrial case studies: anomaly detection, forecasting, multi length time series data, extreme value prediction, incremental learning in time series.	
11.	**Textbook(s):** 1. Prakash P and Avishek P, *Practical Time-Series Analysis*, 1st Edition, Ingram short title (2017). 2. Shumway R and Stoffe D, *Time Series Analysis and its Applications*, 4th Edition, Springer (2016).	
12.	**Reference(s):** 1. Brownlee J, *Deep Learning for Time Series Forecasting*, 1st Edition, Machine Learning Mastery (2019). 2. Brownlee J, *Introduction to Time Series Forecasting With Python: How to Prepare Data and Develop Models to Predict the Future*, 1st Edition, Machine Learning Mastery (2019). 3. Hyndman R and Athanasopoulos G, *Forecasting: principles and practice*, 2nd Edition, OTexts (2018). 4. Nielsen A, *Practical Time Series Analysis: Prediction with Statistics and Machine Learning*, 1st Edition, O'Reilly (2019).	