School of Computer Science Engineering and Technology

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| Course- B. Tech | Type- Specialization Elective |
| Course Code- CSET369 | Course Name- Time Series Analysis |
| Year- 3rd Year | Semester- V |
| Date- Week 7 |  |

**Lab Assignment -7**

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| Experiment | CO1 | CO2 | CO3 |
| AR, MA |  |  |  |

**Objective:** To apply autoregressive and moving average models for forecasting and analyze the concept of the long-run mean in time series data.

Download the following time series dataset and read them as a python dataframe and print the heads.

* **Dataset:** **Monthly Air Passenger dataset**

**Perform all the following tasks on the above dataset.**

**Tasks**

Task 1 — **Autoregressive (AR) Model**

* Fit an AR(p) model to the dataset.
* Select lag order using **PACF**.
* Report estimated AR coefficients and interpret their meaning.

Task 2 — **Moving Average (MA) Model (Forecasting)**

* Fit a Moving Average model of appropriate order (MA(q)) using **ACF**.
* Generate a **5-step ahead forecast**.
* Plot the forecast along with the actual series and interpret the results.

Task 3 — **Long-Run Mean Analysis**

* Derive the long-run mean implied by the AR/MA model.
* Compare the model-implied long-run mean with the actual series mean.