THE UNIVERSITY OF HONG KONG
DEPARTMENT OF STATISTICS AND ACTUARIAL SCIENCE
STAT8003 Time Series Forecasting (2025-26 1st semester)
Group Project (no more than 4 students per group) (20% of total assessment)
(Due date: On or before final exam date)

Find a time series with sample size $n > 100$, and delete the last 5 values for forecast comparison at the end of this project. Answer the following questions. You may use R or Python software whenever appropriate.

1. Introduce briefly the background of this time series.
2. Draw the time plot, and check whether or not it is stationary and whether or not it needs transformations.
3. Transfer this time series into a stationary sequence if possible. Specify the reasons for your action.
4. Specify the model(s) based respectively on sample ACFs, and on the sample PACFs.
5. For each specified model,
    (a) estimate the parameters.
    (b) use Ljung-Box test to check the fitted model is adequate or not. Please try several different K here.
    (c) use over-parameterized method to check the adequacy of the fitted model.
    (d) suggestion some alternative models if the fitted model is not adequate.
    (e) check these alternative models.
6. Use AIC to select one model if there are more than one adequate models, and check the normality of time series.
7. Forecast the 5 future values, and compare them with the true values.
8. Any new insight into this time series based on the above process?

Format: The project report should include a title, abstract, motivation, model, data, methodology, analysis, discussion, conclusion, references and computer code (if any). A table of contents should also be given at the start of the report.