

PROJECT GUIDELINES (SPRING 2020)
FIRST DRAFT DUE ON SUNDAY APRIL 5, 2020 by 11:59 PM

Your final project will consist of the following parts:

1. Introduction and Overview
2. Univariate Time-series models.
 - 2.1 Deterministic Time Series Models (Seasonal Dummies and Trend, Cyclical Trend) and Error model.
 - 2.2 ARIMA models (with seasonal ARIMA components if relevant)
 - 2.3 Comparison of models (in terms of fit and validation)
3. Multivariate Time Series Models
4. Conclusion

The final write-up will be less than or equal to 25 pages including all figures, tables, etc. All analyses will be made using SAS. No exceptions are allowed.

In the First Draft: You will write part of Sections 1 and 2. In your Introduction section talk about the main series you are interested in modeling and your data. Start with the time series plot of the series and talk about any features such as trends and seasonal behavior. You can also present seasonal box plots to further investigate the seasonal behavior and the periodogram to determine any cyclical behavior. You can also present the sample autocorrelation of the series in this section.

In all your analyses, please use a hold-out sample of either 10%-15% or 20-30 observations (depending on your sample size) in all models.

In Deterministic Time Series Model Section (2.1), you will investigate if a seasonal dummies and a trend model is appropriate in describing the series. You will present your SAS analysis results and interpret them. Once you estimate the model obtain a time series plot of the actual versus predicted (fitted) values of the series. Then look at the ACF and PACF of the residuals and accordingly, estimate an error model and present your results.

In the ARIMA Models of section 2.2, present the autocorrelation and partial autocorrelation (and inverse autocorrelation) functions of the series. If the series is nonstationary, you can use differencing and then present the ACF and PACF of the differenced series. Then try to identify either an Autoregressive (AR), or a Moving Average (MA) Process or an ARMA process for the series. Present your analysis,

interpret results and again obtain a time series plot of the actual versus predicted (fitted) values of the series.

In your write up, include all the necessary figures and the outputs within the text and you refer to them to justify your analyses and models. All the figures, tables and output **MUST** be numbered and properly referred in the text. Please **NEVER** include a figure, table or an output that is not referred in the text.

Please submit your draft as a pdf and include a copy of your data used in your analyses. This should be a tab limited text data that I can easily read into SAS without any problems.

The second draft guidelines will be sent on April 13th and the final project will be submitted by 12 noon on May 13th.