STATS 326
Applied Time Series
ASSIGNMENT FIVE
Due: 30 May, 11.00 am

(Worth 6% of your final grade)

Hand-in to the appropriate STATS 326 Hand-in box in the Student Resource Centre

This assignment will be marked out of 100. Please follow the instructions carefully. Marks will be deducted if you include **R** output, plots etc that are not asked for. Only include what is requested in each question in your answers. You are encouraged to print your assignment "2-up" to save paper.

The data for this assignment is the same as the data used in Assignments Two and Three.

Find the "best" predicting SARIMA model and compare its predictions with those from the "best" predicting model from Assignments Two and Three. (Make sure you check the answer guides for Assignments Two and Three to make sure you have the correct "best" predicting model.)

Question One: [40 marks]
Use the differencing techniques (Chapter 5 of the Course Notes) to model the dioxide concentration data. Model the data for 2000 to 2016 (as you did in previous assignments) and use the predict function in **R** to do the 4 predictions for 2017. Compare the predictions to the actual values for 2017. Is your SARIMA model a better predicting model than the best predicting model found in Assignments Two and Three? Justify your answer.

In your assignment only include the **R** summary output for your best fitting model, a plot of the Residual Series and a plot of the acf of the Residual Series from your model. Comment on the plots. Also include the **R** commands and output for the predictions and for your comparison of the predictions with the actual values for 2017.

Question Two: [50 marks]
Re-run the best fitting model from Question 1 in **R**, but use all the data (2000 – 2017). Copy the **R** summary output for the model into your assignment. Write out the model in backshift notation. Multiply out the model and calculate the forecasts for the next 4 quarters using a calculator (see pages 170 – 171, 179 – 180 and 186 of the Course Notes). Show all working.

Question Three: [10 marks]
Write a brief Executive Summary of the main findings from the analysis of the Barrow dioxide concentration data from Assignments 2, 3 and 5. You should keep in mind your original task ("find the best predicting model and generate predictions for the next year").

Hint: You will need to adapt what you learned about writing Executive Summaries in STATS 20x and/or other courses into a Time Series setting. Ensure you address **your original task**.