**STAT 391: Time Series (Independent Study)**

**Course Outline**

**Fall 2024**

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| **Week** | **Topics** | **Readings and Assignments** |
| August 26 | Time Series Introduction | Shmueli & Polak, Chapters 1-2 |
| September 2 | Performance Evaluation | Shmueli & Polak, Chapter 3  Assignment 1 |
| September 9 | Forecasting | Shmueli & Polak, Chapter 4 |
| September 16 | Smoothing | Shmueli & Polak, Chapter 5  Assignment 2 |
| September 23 | Trend & Seasonality | Shmueli & Polak, Chapter 6 |
| September 30 | Autocorrelation Models | Shmueli & Polak, Chapter 7  Assignment 3 |
| October 7 | Neural Network Models | Shmueli & Polak, Chapter 8 |
| October 14 | Neural Network Models | Shmueli & Polak, Chapter 8  Assignment 4 |
| October 21 | Forecasting Binary Outcomes | Shmueli & Polak, Chapter 9 |
| October 28 | Forecasting Binary Outcomes | Shmueli & Polak, Chapters 9 & 10  Assignment 5 |
| November 4 | Stock Price Project | Shmueli & Polak, Section 11.3 |
| November 11 | Stock Price Project |  |
| November 18 | Stock Price Project | Project Assignment |
| November 25 | Entropy and Information  Granger Causality and Cross Convergent Mapping | Readings TBA |
| December 2 | Early Warning Signals | Readings TBA Assignment 6 |

**Meetings**

Meetings will be arranged by mutual consent. Although meetings may occur at any time, it is anticipated that they will be more frequent during the last half of the course.

**Readings**

Coghlan, A. (2015). *A little book of R for time series*.

Shmueli, G., & Polak, J. (2024). *Practical time series forecasting with R: A hands-on guide* (Third edition). Axelrod Schnall Publishers.

Other readings as assigned

**Assignments and Assessment**

Each assignment is due at the end of the week during which it is assigned. The assignments will all receive equal weight, except for the Project Assignment, which will count as 3 assignments.

Except where noted, all Exercises are taken from Shmueli & Polak (2024)

Assignment 1: Section 2.6, Problems 1, 2, 3, 5

Section 3.7, Problems 1, 2, 3

Assignment 2: Section 4.5, Problems 1, 2

Section 5.8, Problems 1, 3, 5, 7, 9

Assignment 3: Section 6.5, Problems 2, 4, 6

Section 7.5, Problems 1, 2, 3, 5, 7

Assignment 4: Section 8.8, Problems 1, 2, 3, 4

Assignment 5: Section 9.6, Problems 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Project Assignment: Case 11.3 (Forecasting Stock Price Movement)

Assignment 6: TBD