Course Description

3470:477/577   *Time Series Analysis*   **3 credits**

Prerequisite: 3450:450 or 451 or 461 or equivalent or permission of instructor.

Course Description: Stationarity. ARIMA modeling with seasonality. Parameter estimation, model diagnostics and forecasting. Regression with autocorrelated errors. Cointegration and Multivariate ARMA models. Heteroscedasticity and Long-memory models.

Course Topics:

1. Stationarity
    Concept of week and strong stationarity. ACF and sample ACF.
2. Trends
    Deterministic Trends vs Random Trends. Random walk with and without drift.
3. Autoregressive Models
    Parameter estimation. Stationarity condition. Causal representation.
4. Moving Average Models
    Parameter estimation. Stationarity condition. Inverted representation.
5. ARMA model, ARIMA model, Seasonal ARIMA model
    Box-Jenkins methodology. Indication for over/under-differencing. Test for presence of seasonal component.
6. Regression with Correlated Errors
    Deterministic trend with covariates. ARIMAX model.
7. Heteroscedasticity
    Identification, Generalized autoregressive heteroscedastic model.
8. Structural Stability
    Parameter consistency. Identification and hypothesis test.
9. Cointegration
    Concept of cointegration. Granger method.