

الموضوع	الأسبوع
- Course goals, expected knowledge after completing the course, explain methods of evaluating the student's performance. - Introduction-examples of time series data- goals of time series analysis- measuring forecasting errors-choosing the appropriate method for forecasting- types of change in time series	1
- Covariance function-autocorrelation function (importance – estimation)- form of the ACF for some cases (non-stationary series , oscillating series, seasonal series)- partial autocorrelation function- estimating the PACF. - Time series operators (backshift operator, difference operator), using the difference operator for non-stationary series in the mean- variance stabilizing transformations-Box-Cox transformations	2
- Stochastic time series models- meaning of linearity in regression models and in time series models- white noise process- stationarity of W.N. process- general linear process- invertibility formula- white noise formula - autoregressive processes (AR)- autoregressive process of order one (stationarity condition, ACF, PACF), AR(2) (stationarity conditions, ACF, PACF)- general AR(p)	3
- moving average processes (MA)- MA(1) (invertibility condition, ACF, PACF)- MA(2) (invertibility condition, ACF, PACF)- general MA(q)- ARMA(p,q) models- ARMA(1,1) model (stationarity condition, invertibility condition ACF, PACF)- integrated ARIMA(p,d,q) models	4
- Parameter estimation- moments method - estimating white noise variance- least squares method - Forecasting – minimum mean square error forecast- forecasting for AR(1), MA(1) , some results for the general ARMA(p,q), forecast error variance- constructing confidence limits for the forecasts- updating the forecasts	6
Box-Jenkins methodology- design and construction of forecasting model- model identification- choosing difference order- choosing model order- checking model validity- diagnostics- residual analysis- criteria for choosing the best model (AIC, BIC)- analysis of higher (lower) order models.	7
- Homework includes data analysis and writing reports	8
- Seasonal models- seasonal autoregressive models- moving average models- mixed seasonal models- multiplicative seasonal models	9
- Applications of time series analysis in the lab. Using R program	10
- Applications of time series analysis in the lab. Last date to hand over the project.	11
اختبارات نهائية	12
	13

## Textbooks

1- Time Series Analysis, by J. Cryer and k. Chan (2008). Springer

2- The Analysis of Time Series, by C. Chatfield (2003). Chapman and Hall

2. البرنامج الإحصائي المستخدم (إن وجد). برنامج R
3. توضيح آلية التقييم للطلاب وتحديد مواعيد الاختبارات الفصلية والاختبارات القصيرة وتسليم الواجبات والمشاريع (إن وجد).
4. يحرم الطالب من دخول الاختبار النهائي إذا تجاوز نسبة غيابه (25%) في جميع أنشطة المقرر (المحاضرات والتمارين أو العملي).

آلية التقييم:

التاريخ	اليوم	الدرجة	الأعمال الفصلية
1444-6-26هـ	الخميس	30	الاختبار الفصلي (1)
1444-7-1هـ	الإثنين	15	HW
1444-7-22هـ	الإثنين	15	تقديم مشروع
1444-8-7هـ	الإثنين	40	الاختبار النهائي

التقييم (1) و(2): قد يكون اختبارات قصيرة – واجبات - مشاريع