



**The University of Economics, Prague  
(Vysoká škola ekonomická v Praze)**

## **Advanced Statistical Methods: Applied Economic and Business Forecasting**

### **Course Description**

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# **Advanced Statistical Methods**

## **Applied Economic and Business Forecasting**

### **Course Description**



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#### **AIMS**

- To forecast future values of economic and business time series data
- To introduce applied non-probabilistic algorithmic methods of forecasting
- To introduce applied probabilistic Box-Jenkins methodology and ARIMA modelling to forecast future behaviour of time series data

**PREREQUISITE** Basic knowledge of statistical theory

#### **LEARNING OUTCOMES**

On successful completion of the course, students will be able to:

- Analyse economic and business time series data and select appropriate forecasting techniques for them;
- suggest suitable non-probabilistic algorithmic models of forecasting for a time series data;
- suggest tentative ARIMA models of forecasting using Box-Jenkins methodology for a non-seasonal time series data;
- evaluate and critically assess the validity of the modelling outcomes from the computer output;
- use appropriate criteria to identify optimal model for forecasting using Box-Jenkins methodology;
- forecast future values for economic and business time series data

#### **CURRICULUM CONTENT**

- Measures of forecasting errors and their applications.
- Forecasting methods for seasonal data: Additive and Multiplicative Decomposition Methods involving centred moving averages and statistical regression technique.
- Forecasting method for data without a trend: Single Exponential Smoothing.
- Forecasting methods incorporating trend: Brown's Method, Holt's Method.
- Box-Jenkins Forecasting Methodology and Modelling Procedures: AR, MA and ARIMA models; stationarity and invertibility; Ljung-Box diagnostic model testing; back-shift operator; Akaike and Schwartz Bayesian model selection criteria.
- Use of appropriate industry standard software packages (e.g. SAS for Box-Jenkins modelling and forecasting methods and MS-Excel and Solver for other methods).

## **TEACHING AND LEARNING STRATEGY**



**Prince Václav**



**Prague Castle in 1607**

The theoretical aspects will be delivered through a series of lectures, developing from the basic moving average methods. The lectures will be complemented by practical sessions in which economic and business time series data will be analysed. Here, tentative models are identified and forecasts are made using an appropriate statistical software package.

## **ASSESSMENT STRATEGY**

Assessment consists of group modelling assignments. The group assignments are designed to assess understanding of students in selecting appropriate forecasting techniques and models for their time series data, evaluating the validity of their models by interpreting the results from their computer output, conducting relevant tests and performing diagnostic checking and making useful and informative forecasts.

## **BIBLIOGRAPHY**

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