

Course 332 – Modeling Concepts

Course Description

This course introduces and explains fundamentals of mass appraisal model building. Chapter 1 explains the role of models in mass appraisal and describes basic model structures and steps in model development. Chapter 2 covers exploratory data analysis, including descriptive statistics, charts and graphs, and spatial analyses. Chapter 3 describes data transformations, which largely determine the accuracy achieved for a given database. Chapter 4 introduces multiple regression analysis, including regression statistics and options, the interpretation of results, and separation of land and building values. Chapter 5 covers the review and support of mass appraisal values and chapter 6 describes mass appraisal reporting. The course includes a large number of demonstrations and labs using Excel, which is capable of producing basic models for a limited number of variables. Follow-up courses 333 and 334 cover residential and commercial modeling, respectively, in more depth and use the powerful but user-friendly statistical package, SPSS, in labs and demonstrations, thus this course serves as a foundation and bridge to IAAO's two follow-up model building courses.

Objectives

On completion of Chapter 1, the student should be able to:

- Identify components and characteristics of mass appraisal methods.
- Identify strengths and weaknesses of mass appraisal methods.
- Define terms commonly used with modeling concepts.
- Differentiate between independent and dependent variables.
- Calculate GRM given appropriate information.
- Identify types of models by structure.

Upon completion of Chapter 2, the student should be able to:

- Identify steps in creating graphs and charts using Excel.
- Calculate and interpret common statistical measures.
- Select best statistical function for a given scenario.
- Define common statistical terms used in modeling.

On completion of Chapter 3, the student should be able to:

- Determine variables to include in specific models.
- Make calculations to determine value.
- Identify strengths and weaknesses of different classes of transformations.
- Identify steps to use Excel to create transformations.
- Identify the characteristics and uses of different classes of transformations.

On completion of Chapter 4, the student should be able to:

- Define terms related to regression analysis.
- Interpret results of operations related to regression analysis.
- Identify methods of computing common components of regression analysis.
- Select appropriate components to use regression analysis.
- Identify characteristics and uses of individual regression analysis components.
- Make calculations related to regression analysis.

On completion of Chapter 5, the student should be able to:

- Identify features and acceptable levels of value acceptability.
- Identify characteristics of a statistically reliable regression model.
- Identify components and limitations in given value determination methods and models.
- Identify IAAO standards relating to mass appraisal.
- Identify the best data collection tool for given situations.

On completion of Chapter 6, the student should be able to:

- Identify the establishing authority for minimum value report requirements.
- Identify IAAO Standard requirements describing when value notices should be sent.
- Identify IAAO Standard requirements describing annual reports.
- Identify components for USPAP compliant mass appraisal reports.
- Recall components of a summary report.

Timetable

Topic	Time Requirement	Day Covered
Chapter 1		
Purpose and Role of Models	20 Minutes	Monday AM
Model Specifications and Calibrations	30 Minutes	Monday AM
Basic Model Structures	30 Minutes	Monday AM
Expanded Model Structures	20 Minutes	Monday AM
Cost, Income, and Sales Comparison Models	30 Minutes	Monday AM
Steps in Model Building	20 Minutes	Monday AM
Review Questions	15 Minutes	Monday AM
Chapter 2		
One-Variable Analyses	240 Minutes	Monday AM/PM
Multiple-Variable Analyses	200 Minutes	Monday PM/Tuesday AM
Spatial Analyses	30 Minutes	Tuesday AM
Review Questions	20 Minutes	Tuesday AM

Topic	Time Requirement	Day Covered
Chapter 3		
Rationale and Objectives of Data Transformations	10 Minutes	Tuesday AM/PM
Binary Transformations	40 Minutes	Tuesday PM
Scalar Transformations	30 Minutes	Tuesday PM
Exponential Transformations	20 Minutes	Tuesday PM
Logarithmic Transformations	40 Minutes	Tuesday PM
Polynomial Transformation	30 Minutes	Tuesday PM
Spline Transformation	45 Minutes	Tuesday PM
Multiplicative Transformation	45 Minutes	Tuesday PM/Wednesday AM
Quotient Transformation	30 Minutes	Wednesday AM
Reciprocal Transformation	15 Minutes	Wednesday AM
Review Questions	20 Minutes	Wednesday AM
Chapter 4		
Overview of Regression Analysis	60 Minutes	Wednesday AM
Regression Analysis with Excel	90 Minutes	Wednesday AM
Goodness of Fit Measures	75 Minutes	Wednesday PM
Measures of Variable Importance and Reliability	75 Minutes	Wednesday PM
Regression Options	20 Minutes	Wednesday PM
Predicted Values, Residuals, and Outliers	90 Minutes	Wednesday PM/Thursday AM
Caveats and Limitations of Regression Analysis	30 Minutes	Thursday AM
Separating Land and Building Values	20 Minutes	Thursday AM
Review Questions	20 Minutes	Thursday AM
MRA Case Study Problem	200 Minutes	Thursday AM/PM
Chapter 5		
Aspects of Value Review and Acceptability	30 Minutes	Thursday PM
Model Review	15 Minutes	Thursday PM
Office Review	15 Minutes	Thursday PM
Field and Individual Value Review	15 Minutes	Thursday PM

Topic	Time Requirement	Day Covered
Value Defense and Comparable Sales	30 Minutes	Thursday PM
Review Questions	15 Minutes	Thursday PM
Chapter 6		
Professional Requirements and Standards	10 Minutes	Thursday PM
Traditional Value Reporting	5 Minutes	Thursday PM
Mass Appraisal Reports	10 Minutes	Thursday PM
Discussion and Review Questions	10 Minutes	Thursday PM