



IAAO

INTERNATIONAL ASSOCIATION
of **ASSESSING OFFICERS**

Valuing the World

Course 311 - Residential Modeling Concepts



Course Description

Course 311 presents a detailed study of the mass appraisal process as applied to residential property. Topics covered include a comparison of single-property appraisal and mass appraisal, the major steps in the mass appraisal process, data requirements, market analysis, application of the approaches to value, use of sales ratio studies, and valuation review techniques. Recommended: Course 300, MARP

Objectives

Upon completion of Section 1, you will be able to:

- Describe similarities and differences between single property appraisal and mass appraisal.
- Identify the major steps in the mass appraisal process.
- Define the three types of data used in the mass appraisal process.
- Distinguish between model specification and model calibration.
- List the primary determinants of supply and demand for residential real estate.
- Understand how supply and demand interact to determine price.
- Understand the basic and expanded model structure.
- Distinguish between additive, multiplicative, and hybrid model structures.

Upon completion of Section 2, you will be able to:

- Describe several means of determining which data items are required for accurate valuation models.
- List several sources of cost data.
- Describe several sources of sales data and their relative advantages and disadvantages.
- Distinguish between qualitative and quantitative data and provide examples of each.
- Distinguish the differences among continuous, discrete, and binary data and provide examples of each.
- Distinguish between objective and subjective data and give examples of each.
- Describe how binary and scalar variables are created and explain their relative advantages and disadvantages in mass appraisal models.
- Define and give examples of reciprocal transformations.
- Define and give examples of exponential transformations.
- Describe how data is affected when raised to exponents of (a) zero, (b) one, (c) greater than one, (d) less than one but greater than zero, and (e) less than zero.
- Define logarithmic transformations and give examples of their use.
- Describe and give examples of multiplicative and quotient transformations.

Upon completion of Section 3, you will be able to:

- Describe three general approaches to stratification and location analysis in mass appraisal.
- Define a market area and sub-area.
- List several criteria for determining market area and sub-area boundaries.
- Describe the global modeling approach to mass appraisal.
- List several criteria for defining class intervals in frequency distributions.
- Understand and explain histograms.



- Find percentiles from a data array.
- Compute the median, mean, mode, and standard deviation.
- Interpret a cross-tabulation.
- Describe the use and advantages of line charts.
- Interpret correlation coefficients.
- Describe a contingency table.

Upon completion of Section 4, you will be able to:

- List several uses of ratio studies.
- Define and compute the median, mean, and weighted mean.
- Define, compute, and interpret the coefficient of dispersion (COD) and coefficient of variation (COV).
- List the IAAO standards for the COD for residential property.
- Define, compute, and interpret the price-related differential (PRD).
- Define and graphically illustrate assessment regressivity and progressivity.
- Interpret a box plot.
- Interpret a scatter diagram.

Upon completion of Section 5, you will be able to:

- Understand that the building cost components represent the supply side of the market.
- Understand that depreciation represents the demand side of the market.
- Understand that accurate land values are crucial to the cost approach.
- Understand the structure of residential cost models, including the role of stratification and typical characteristics in developing base specifications.
- Understand comparative unit cost.
- Write the formula for a hybrid (generic) cost model including depreciation and land value.
- Construct depreciation schedules.
- Calibrate cost models to the market.

Upon completion of Section 6, you will be able to:

- Write the basic formula for an additive, multiplicative, or hybrid model.
- Apply an additive, multiplicative, or hybrid model to a given subject parcel.
- Explain which calibration methods are appropriate for additive, multiplicative, and hybrid model structures.
- Distinguish between simple and multiple regression analysis (MRA).
- List the requirements of effective MRA models.
- Explain the coefficient of determination (R-Square) and distinguish between R-Square and adjusted R-Square.



- Explain the standard error of estimate (SEE).
- Explain how a COV can be extracted from MRA output.
- Interpret t-values and F-values associated with individual regression variables.
- Describe the beta-value associated with a regression variable.
- Describe the mechanics and purpose of stepwise MRA.
- Define a regression residual and know the numeric value of the average residual.
- Explain the mechanics and purpose of constrained MRA.
- Explain the basic assumptions made in MRA.
- Describe the mechanics of feedback and its advantages and disadvantages relative to MRA.
- Describe comparable sales models and their use in mass appraisal.
- Describe Euclidean and Minkowski (city block) distance metrics used in comparable sales models.
- Describe the operation, advantages, and limitations of Location Value Response Surface Analysis (LVRSA).

Upon completion of Section 7, you will be able to:

- Explain the importance of accurate land and building values in the sales comparison approach.
- Describe three methods of estimating land values from land sales data.
- Write a sample decomposable valuation model.
- List three methods of calibrating a decomposable model.
- List two approaches to establishing building values in the sales comparison approach.
- Explain the role and importance of value review in mass appraisal process.
- Distinguish between office and field review and state the purpose of each.
- Describe the purpose of a pilot study.
- Describe the various statistical information important in the office review of values.
- Describe information helpful in field reviews.
- Describe how photographs, video laser disks, orthophotography and other mapping/GIS information can assist in the value review process.
- List three aspects of value acceptability.
- List several methods of improving the stability of values year to year.
- Describe several strategies for updating values and their relative advantages and disadvantages.



Topic	Time Table	Day Covered
Section 1		
Introduction - Modeling Concepts	120 Minutes	Monday AM
Section 2		
Residential Data Collection and Management	240 Minutes	Monday AM/PM
Section 3		
Market Analysis	90 Minutes	Monday PM
Section 4		
Sales Ratio Studies	240 Minutes	Tuesday AM/PM
Section 5		
Cost Approach	210 Minutes	Tuesday PM
Section 6		
Sales Comparison Approach	540 Minutes	Wednesday AM/PM/Thursday AM
Section 7		
Separation of Land and Building Values	180 Minutes	Thursday AM/PM
Section 8		
Reviewing and Maintaining Values	180 Minutes	Thursday PM
Examinations	240 Minutes	Friday AM