Practical Intermediate Algebra -- 5 Semester Units

Math 71X: Practical Intermediate Algebra: Intermediate Algebra for the non-calculus path. Recommended for Humanities, Social Sciences, and Applied Sciences. This course is the recommended prerequisite for Math 100, Math 110, and Math 120.

Topic	Timeline
Scientific Essentials: Modeling Using Direct Variation & Formulas in Applications, Percents and Proportions – Direct and Inverse, Joint, Estimates, Error, Units and Unit Conversion, Order of Operations; Algebraic Simplification: rational expressions, radicals, and exponents; Graphs – Functions, Scatter Plots, Histograms, Pie Charts.	5 Hours
Linear Models: Introduction to Linear Functions, Linear Models – Deterministic & Probabilistic, Slope as rate of change, *y*-Intercept as initial value, Slope-intercept form, Point-slope form, Error in estimates which use linear models: $\Delta y = m \cdot \Delta x$, Absolute error and relative error.	6 Hours +1 Lab Hour
Linear Systems: Modeling with Linear Systems , Matrices and Upper Triangular Form, Vector Algebra Essentials, Matrix Multiplication, Linear Regression.	7 Hours + 1 Lab Hour
Quadratic Models: Introduction to Quadratic Functions; Vertex Formula and Intercepts, Quadratic Models – Deterministic & Probabilistic, Fitting Quadratic Models to Paired Data using Least Squares Methods, Graphing Quadratic Equations in Two Variables, Approximating Zeros using the Intermediate Value Theorem, Quadratic Equations in Applications, Solving Quadratic Equations Using the Quadratic Formula, Completing the Square and the Square Root Property.	9 Hours + 1 Lab Hour
Rational Models: Introduction to Rational Functions, Rational Models - Deterministic & Probabilistic; Asymptotic Behavior in Applications, Fitting Rational Models to Paired Data in Proportionalities using Least Squares Methods, Solving Rational Equations.	6 Hours + 1 Lab Hour
Radical Models: Introduction to Radical Functions, Radical Models - Deterministic & Probabilistic, Graphing Radical Equations in Two Variables, Radical Equations in Applications, Fitting Paired Data to Functions Containing Radicals using Least Squares Methods, Properties of Radicals, Solving Radical Equations.	6 Hours + 1 Lab Hour
Exponential and Logarithmic Models: Introduction to Exponential Functions, Exponential Models in Applications, Inverse Functions, Introduction to Logarithmic Functions, Logarithmic Models in Applications, Fitting Paired Data to Exponential and Logarithmic Models using Least Squares Methods, Solving Exponential and Logarithmic Equations.	11 Hours + 1 Lab Hour
Summary of Mathematical Models: Fitting data to Models, Ratios, Proportions, and Percents, Solving Equations, Isolating Variables in Literal Equations.	4 Hours
Sequences, Series and Probability: Introduction to Sequences and Series, Geometric Sequence/Series Models in Applications, Binomial Experiments and The Binomial Theorem.	4 Hours + 1 Lab Hour
Total	65 Hours

Notes:

1. Each chapter is to begin with the one-hour student lab activity provided in the textbook, and end with students submitting a lab report which answers all questions asked throughout the chapter referring to their experimental observations.
2. Emphasis should be stressed throughout the semester on ratios, proportions, unit conversion, isolating variables, estimates, error analysis, and scientific notation.
3. Textbook: Practical Intermediate Algebra by Birca, Edwards, Franko, Guth, Hosea, McMullin, Nitta, Summers, and Zicree (to be released by Summer 2009, available at bookstore for cost, or free download).

Measurable Objectives for Math 71X – Practical Intermediate Algebra

1. Students will demonstrate in writing changes of units and other applications of ratios and proportions.
2. Students will isolate variables in equations of linear, quadratic, rational, radical, exponential and logarithmic forms.
3. Students will model real-world phenomena using least-squares methods for data which approximate linear, quadratic, rational, radical, exponential and logarithmic functions.
4. Students will apply algebraic analysis to functions described above and give real-world meaning to intercepts, slope, asymptotes, and extrema.
5. Students will use infinite series to model and quantify real world phenomena.
6. Students will use data gathering instruments to sample data for curve fitting.