1/14 Instrument Calibration I: 1st Order Calibration Curve

- *Calibration Curve Handout*
- *Excel Example Worksheet*
- *Calibration graphs in instrumental analysis*
- *Product-moment correlation coefficient*
- *Regression of y on x*
- *Calculation of concentration and its random error*
- *Linest Excel Function (Harris Section 4.7)*
- *Problem Set 1: "Cadmium Calibration Problem"*

1/21 Instrument Calibration II: ANOVA, Regression Calculations, Curvilinear Regression Methods

- *Variance, Sum of Squares (SS), and Degrees of Freedom (DOF*
- *Total Sum Squares (SS_{tot}), Regression SS (SS_{regr}), Residual SS (SS_{res}), and Coefficient of Determination (R^2)*
- *Replicate Sum of Squares (SS_{repl}) and Lack of Fit Sum of Squares (SS_{lof})*
- *Curvilinear regression methods*
- *Calculation of unknown concentrations from nonlinear curves (Harris Box 4-2)*
- *Problem Set 2: "Sum of Squares Calculation," Sum of Squares Classroom Handout*

1/28 Instrument Calibration III: Limits of Detection, the Method of Standard Addition Class Examp

- *Limits of detection*
- *Method of standard additions*
- *Problem Set 3*

2/4 Instrument Calibration IV: Internal Standard Methods of Quantitation Class Example

- *Internal standard (IS) methodology (Harris 5-4)*
- *Response factor IS methods*
- *Response ratio IS methods*
- *Problem Set 4*

2/11 Descriptive Statistics I:

- *Mean and standard deviation*
- *Distribution of repeated measurements*
- *Log-normal distribution*
- *Sample definition and sampling distribution of the mean*
- *Confidence limits of the mean for large samples*

2/18 Calibration Quiz in Sims 211

2/25 Inferential Statistics: Class Example Spreadsheet,

- *Comparison of experimental mean with known value*
- *Comparison of two experimental means*
- *Paired t-test*
- *One-sided and two-sided tests*

- *F-Test for the comparison of standard deviations*
- *Outliers*
- *Problem Set 5*

3/3 Analytical Quality I

- *Overview of Statistical Process Control(SPC)*
- *Shewhart Control Charts for mean values and ranges*

3/10 ANOVA

- *PS6 Shewhart Control Charts Due Data Set*

3/24 Multivariate Regression

- *Multivariate Linear Regression Classroom Data*
- *Mathematical models to describe experimental data*
- *Determining the model*
- *Predictions, root-mean-square errors of calibration and prediction*
- *Problem Set: Predicting Daily Maxium Ozone Concentrations*

3/31 No Class Problem Set Due: Predicting Daily Maxium Ozone Concentrations

4/7 Quantitative Structure-Activity Relationships(QSAR)

4/14 No Class QSAR Problem Set Due; QSAR Data Set

4/21 Review

4/29 Cumulative Final Examination 3:00 PM