Business Analytics

ECO256-B *(CRN:* 30474*)*

Fall 2019 (Lecture: Aug 26, 2019 - Dec 07, 2019)

Instructor:	Paul Yan
Contact Information:	Email: yany@canisius.edu Phone: (716) 888-2604 Office: CT308
Lecture Hours/Location:	TTR: 1:00 am - 2:15 pm @ OM 119
Office Hours/Location:	R: 2:30pm-3:40pm or by appointment @ CT308
Prerequisites:	ECO255
Textbooks: (anyone will be fine)	Statistics for Business and Economics (13e, revised edition), Anderson, Sweeney, Williams, Camm, Cochran, 2017, *Cengage Learning*, *or* Statistics for Business & Economics (12e, the same authors and publisher)
Websites:	https://d2l.canisius.edu (for syllabus, HW, Data cases, etc.) https://canisius.edu/~yany/excel (for learning Excel)
QR codes	
Course Description:	Five objectives: 1) Review or learn theories related to statistics, such as various distributions (Normal, Student-t, χ^2), mean, standard deviation, sample distribution, hypothesis tests, covariance, correlation, OLS estimation, multi-collinearity, time series and forecasting. 2) Apply theories to finance, accounting and economics 3) Learn how to use Excel to estimate and solver problems, such as average(), stdev(), vlookup(), geomean(), run linear regressions, conduct hypothesis tests 4) Learn how to use good Excel Macros and/or VBA programs 5) Learn how to use real-world data to answer interesting questions. Those publicly available data include Yahoo!Finance, Google Finance, Federal Reserve Bank's data library, SEC filings, French's Data Library
Computational Tool	Microsoft Excel
R software	R is free software which could be downloaded at http://r-project.org

One line R command	`source("http://datayyy.com/bae.R")`
	or
	`source("http://canisius.edu/~yany/bae.R")`
	Note #1: I will explain the above lines during the first lecture.
	Note #2: For this course, I will NOT teach R. Literally, students are

	responsible for just above one-line R code.
Academic Integrity:	Students are expected to know and understand college policies with regard to Academic Integrity Code. Violations of academic integrity will be prosecuted fully. Please note that you are responsible for reporting any instances where other students have violated these policies. Failure to do so will result in penalties as well. If you have any questions about this policy, please see the instructor.
Attendance Policy:	Attending classes regularly is required. Before-class preparation and in-class participation is an integral part of this course. Students are strongly encouraged to participate in class discussions and ask questions. Students are encouraged to discuss current events relevant to this course or their own experiences. Homework problems are regularly assigned.
Academic and Accessibility Support Services:	The GRIFF Center for Academic Engagement provides comprehensive programs, tutoring services, and resources to support student academic and career success. If you would like to learn more about academic support, please stop in Old Main 013 or call 716-888-2170. Visit the GRIFF Center webpage at: http://www.canisius.edu/griff-center/ . Accessibility Support (716-888-2170), which is located in the Griff Center for Academic Engagement (OM 013), is responsible for arranging appropriate academic accommodations for students with documented disabilities. If anyone in this course falls into this category, please contact Accessibility Support so that an appropriate course of action may be determined. For additional information, see http://www.canisius.edu/dss/
Course Level Learning Goals:	Know the functionalities of various Excel embedded functions Understand how to formula a financial problem Knowledge with spreadsheet to present your problem Deign a good way to solve your model Generalize your models
College, Program and Major Learning Goals:	This course is designed to help students achieve one or more College Core, Business Program and/or Major level learning goals and objectives. You can see the specific College, Program or Major level learning goals and objectives associated with the course from this page on the College website: http://bit.ly/bcoreLG
Grade Evaluation:	HW 30% Midterm 30% Final exam 30% Class participation 10% --- Total 100%
Course Schedule:	For the detailed schedule, see below. I reserve the right to change the course schedule throughout the semester. Changes to the schedule will be announced in class or via email.
Academic calendar	https://catalog.canisius.edu/undergraduate/academic-calendar/#academicyear201920text

Course Schedule:

Week	Date	Contents of the lecture	Notes
1	8/27 8/29	Self intro. & syllabus discussion, Review of basic concepts Chapter 1-6: [Review] Sources of public data, population vs. sample, histogram, discrete probability distributions, continuous probability distributions	
2	9/3 9/5	Chapter 7: Sampling distribution Sampling from a finite population, sampling from an infinite population, sampling with/without replacement, computer-generated random numbers, Excel function: rand()	
3	9/10 9/12	Chapter 7 (continued) Excel random numbers generator Point estimation Chapter 8: Confidence interval Margin of Error and the Interval Estimate, Formula of Interval Estimate of mu, Interval Estimate of a Population Mean: Unknown	
4	9/17 9/19	Chapter 8: (continued)	
5	9/24 9/26	Chapter 9: Hypothesis tests Type I and Type II Errors, Population Mean: sigma known Population Mean: sigma unknown, Population Proportion, Null and Alternative Hypotheses	
6	10/1 10/3	Chapter 9 (continued) Chapter 11: Inference about population variances Inference about a Population Variance, Inferences about Two Populations Variances	
7	10/8 **10/10**	Chapter 11: Chi-Square Distribution, Interval Estimation of σ^2. Hypothesis Testing, Interval estimation of σ^2. Hypothesis Testing About a Population Variance **Mid-term**	
8	**10/15** 10/17	**Fall holiday – No Classes** Chapter 14: Simple regression Single-factor linear regression, model assumptions, General formula	

Week	Date	Contents of the lecture	Files
9	10/22 **10/24**	Chapter 14: (continued) how to run a linear regression using Excel, interpretation of Significance Tests, confidence interval **No class (I will attend the FMA annual conference)**	
10	10/29 10/31	Chapter 15: Multiple regression Multiple Coefficient of Determination, model assumptions, testing for Significance, Using the estimated Regression Equation for Estimation and prediction, Categorical Independent Variables	
11	11/5 11/7	Chapter 15: Residual Analysis, Logistic Regression Chapter 16: Model building General Linear Model, Determining When to Add or Delete Variables, Variable Selection Procedures	
12	11/12 11/14	Chapter 16 (continued) Multiple Regression Approach to Experimental Design Autocorrelation and the Durbin-Watson Test	
13	11/19 11/21	Chapter 17: Time series and Forecasting Forecasting Methods, Time Series Patterns, Forecast Accuracy	
14	11/26 **11/28**	Chapter 17: (Continued) **Thanksgiving Holiday - No Classes**	
15	12/3 12/5	Chapter 17: (Continued) Moving Averages and Exponential Smoothing Backup day	
16	**TBA**	**Final**	

Appendix A: After typing `source("http://canisius.edu/~yany/eco256.R")`, the following menu will pop up.

```
*-------------------------------------------------------*
* Business Analytics (ECO256) Spring 2019 by Paul Yan *
*-------------------------------------------------------*
* .c1  Data and Statistics                              *
* .c2  Descriptive Stat: Tabular/Graphical Displays     *
* .c3  Descriptive Stat: Numerical Measures             *
* .c4  Introduction to Probability                      *
* .c5  Discrete   Probability Distributions             *
* .c6  Continuous Probability Distributions             *
* .c7  Sampling and Sampling Distributions              *
*-------------------------------------------------------*
* >.c7       # go to chapter 7 (a dot in front of c7)  *
* >.uu       # go to utility functions                  *
* >.eco256   # back to this menu                       *
* >.ee       # back to this menu (short-cut)           *
*-------------------------------------------------------*
```

Every function or menu is self-explanary. Typing its name would give you an introduction plus a few examples.

Appendix B: After typing `.c1`, (note that there is a dot in front of c1), we see the following instructions.

```
> .c1
function(i){
" i  Chapter 1: Data and statistics
  -  -----------------------------------
  1  Download and install R
  2  How to launch and quit R?
  3  One-line R code for this course
  4  What is Business Analytics?
  5  A list of all data sets for this chapter
  6  Business Analytics/Business Inteligence,reasons 4 a platform
  7  BA (BI) for Accounting and Finance
  8  BA for Marketing and  Production
  9  BA for Economics
 10  Definition of data
 11  Sources of open data
 12  Categorical and quantitative data
 13  Cross-sectional and time series data
 14  Experiment, time/cost, data acquisition errors
 15  Descriptive statistics
 16  Population vs. sample
 17  Data set: Norris
 18  Glossary
 19  Youtube
 20  Links

Example #1:>.c1    # see the above list
Example #2:>.c1(1) # see the first explanation
```

Appendix C: After tying .uu, the following menu will pop up.

```
> .uu
function(){
"
 *-------------------------------------------*
 * Utilities          -- short-cut --        *
 *-------------------------------------------*
 * .inClassEx         # .ice                 *
 * .allChapters       # .all                 *
 * .calendar          # .cal                 *
 * .getdata           # .gd                  *
 *-------------------------------------------*
 * >.ice              # see a list of ice    *
 * >.uu               # back to utilites     *
 * >.ss               # back to main menu    *
 *-------------------------------------------*
```

Appendix D: After tying `.getdata`, the following menu will pop up.

```
> .getdata
function(){
"
 *-------------------------------------------------------------*
 * .getdata                                                    *
 *-------------------------------------------------------------*
 *  Economics             Finance              This book      *
 *-------------------------------------------------------------*
 * .show_usGDPannual      .show_ibmDaily      .searchData     *
 * .show_usGDPquarterly   .showff3Monthly     .showData       *
 * .show_usUnemployRate   .showff3Daily                       *
 *-------------------------------------------------------------*
 * >.show_usGDPannual     # find the usage of the function    *
 * >.getdata              # back to this menu                 *
 * >.ee                   # back to the main menu             *
 *-------------------------------------------------------------*
```