CERTIFIED BUSINESS ECONOMIST®
UNIVERSITY PARTNERSHIP APPLICATION

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1020 19TH STREET NW, SUITE 550
WASHINGTON, DC 20036
NABE@NABE.COM

ABOUT THE CERTIFIED BUSINESS ECONOMIST® PROGRAM

The Certified Business Economist® (CBE) Program is the certification in applied economics and data analytics. The CBE was designed by leading business economists and validates a candidate's competency, ambition to advance within the profession, and commitment to refreshing skills and knowledge throughout their career to stay on the cutting edge of analytical techniques and economic developments.

Candidates who complete the requirements of the CBE Program earn the CBE designation, a symbol that documents professional accomplishments, experience, and abilities.

The CBE is a practitioner-driven program designed by leading business economists to bridge the gap between what is learned in an academic setting and what you need to know as a business economist. Course content ranges from applied econometrics and managerial decision making to verbal communication, presentation skills, and writing proficiency.

More than 60 leading business economists from the following companies helped to develop the curriculum for the Certified Business Economist Program.

American Chemistry Council
Bloomberg
Bureau of Labor Statistics
ERS Group
Fannie Mae
FDIC
Federal Reserve Bank of Atlanta
Federal Reserve Bank of Kansas City
Federal Reserve Bank of St. Louis
Ford Motor Company
Ford Motor Credit Company
Greater Houston Partnership
Haver Analytics Inc.
IBM Corporation
Internal Revenue Service
KPMG
Legacy Wealth Management
Macroeconomic Advisers, LLC
Mesirow Financial
National Association of Manufacturers
National Federation of Independent Business
National Retail Federation
Northern Trust
PNC Financial Services Group
The Group of Thirty
U.S. Department of the Treasury
University of Colorado
Walt Disney Parks & Resorts
Wells Fargo

PURPOSE OF NABE'S CERTIFICATION PARTNERSHIP WITH UNIVERSITIES

By partnering with NABE to incorporate the CBE curriculum into your university program and offer the CBE exam, you will afford your students and faculty the opportunity to:

- Enhance the ready-to-work capacity of your graduates
- Open your faculty to new perspectives on applied teaching methods and activities
- Establish your university as a provider of practical education valued by employers
- Help students to identify a career path in the business environment
- Gain access to NABE Conferences and Events
- Receive assistance in establishing a NABE Student Chapter, if preferred.

In the future, we hope university partners see:

- Better job placement for their graduates
- Increased enrollments in their programs
- Increased alumni network participation

Universities will also receive:

- Use of the CBE logo when promoting their program
- Listing on the NABE website as a CBE University Partner
- Link to universities master's program from the NABE CBE website

CERTIFIED BUSINESS ECONOMIST (CBE) REQUIREMENTS

The NABE Certification Board of Governors adopted the following certification requirements in June of 2012.

Candidates for NABE's certification must meet the following standards.

1. **Member.** Be a member in good standing with the National Association for Business Economics.

2. **Experience***. Candidates must have two years of work experience in applied business economics or in a related field position.

3. **Academic Education**. Candidates must have a four-year degree (bachelor's or the global equivalent) or higher.

4. **Curriculum Requirements.** Candidates must complete NABE's *Communication and Presentation Skills for Business Economists and Analysts* and *Writing Skills for Business Economists and Analysts* certificate courses or courses deemed equivalent by NABE.

5. **Examination.** Candidates must pass a practical examination covering:

    - Applied Econometrics
    - Economic Measurement
    - Macroeconomics
    - Managerial Economics
    - Microeconomics
    - Statistics and Data Analytics

6. **Ethics**. Candidates must sign and adhere to the NABE Code of Ethics.

7. **Continuing Education.** Designees are required to earn 30 hours of continuing education every two years. Education can be earned by attending industry conferences, seminars, or other relevant educational activities. A detailed list of approved activities will be provided to designees.

8. **Renewal Fee**. Designees are required to pay a certification renewal fee of $75 every two years.

9. **Renewal/Reinstatement**. Certification is renewable every two years if the Designee:

    - Is a NABE member in good standing,
    - Has completed 30 hours of Continuing Education, and
    - Has paid the Renewal Fee of $75.

Designees must apply for reinstatement if any or all of the renewal requirements are not met and may not advertise or use the designation mark until they are notified by NABE that their right to the designation has been reinstated.

*University Partner Candidates who pass the exam but do not have the two years of experience earn a pCBE until the experience requirement is met.

THE CBE CURRICULUM

The CBE curriculum consists of six content areas which appear on the exam and two soft skill areas, writing and communication skills, which are required to earn the certification.

- Applied Econometrics
- Communication Skills
- Economic Measurement
- Macroeconomics
- Managerial Economics
- Microeconomics
- Statistics and Data Analytics
- Writing Skills

Please note, detailed content outlines are listed on pages 10-32.

CBE EXAM

Today's business economists and analysts are expected to master a wide array of disciplines. The CBE examination is based on an advanced body of knowledge, developed and reviewed by leading business economists to ensure that it reflects the most relevant information and core competencies demanded by today's top employers. The CBE examination is developed and administered by NABE.

The CBE Exam is a comprehensive multiple-choice assessment, testing a candidate's practical and applied knowledge in the following areas:

- *Applied Econometrics*
- *Business Applications of Statistics and Data Analytics*
- *Economic Measurement*
- *Economics of Strategy and Managerial Decision Making*
- *Macroeconomics / Microeconomics*

About the CBE exam:

The examination contains 137 questions.

Candidates are given three (3) hours and 15 minutes to complete the exam.

The CBE Exam has been grouped into three sections:

Section 1: Macroeconomics and Economic Measurement
Section 2: Statistics and Data Analytics and Applied Econometrics
Section 3: Microeconomics and Strategy and Managerial Decision Making

The passing score for the CBE Exam is 68.6

UNIVERSITY PARTNERSHIP APPLICATION

All accredited universities with a terminal master's program or equivalent in economics are eligible to partner with the National Association for Business Economics (NABE) Certified Business Economist® (CBE) Program. Undergraduate programs in economics can be considered; however, additional requirements will apply. Please contact NABE for further details.

Universities wishing to partner with NABE's CBE Program must complete the application process in which their curriculum will be examined to ensure all aspects of the CBE are covered or a plan put in place to address missing content areas. It is preferred that programs focus on practice in addition to theory, as this aligns more closely with the CBE program and exam.

University Name: _____

Program Name: _____

Contact Name: _____

Address: _____

City, State, Zip: _____

Contact Email: _____

Contact Phone: _____

1. Attach relevant course outlines for **Applied Econometrics**. Identify any missing content or concepts and how you plan to address them:

2. Attach relevant course outlines for **Communication Skills**. Identify any missing content or concepts and how you plan to address them:

3. Attach relevant course outlines for **Economic Measurement**. Identify any missing content or concepts and how you plan to address them:

4. Attach relevant course outlines for **Macroeconomics**. Identify any missing content or concepts and how you plan to address them:

5. Attach relevant course outlines for **Managerial Economics**. Identify any missing content or concepts and how you plan to address them:

6. Attach relevant course outlines for **Microeconomics**. Identify any missing content or concepts and how you plan to address them:

7. Attach relevant course outlines for **Statistics and Data Analytics**. Identify any missing content or concepts and how you plan to address them:

8. Attach relevant course outlines for **Writing Skills**. Identify any missing content or concepts and how you plan to address them:

Additional Requirements:

Exam Offerings:
NABE offers the CBE either at a testing center or virtually. For a limited time, the exam cost to students at the university will be $100, with a generous grant from *The NABE Foundation*. The standard exam fee is $500.

Renewal

The CBE Partner Agreement will be reviewed on a two-year basis to ensure both parties remain in line with the agreement.

NABE Contact:

Dori Allard
Senior Advisor, Education
National Association for Business Economics
1020 19th Street NW, Suite 550
Washington, DC 20036
(202) 463-6223
dori@nabe.com
www.nabe.com

APPLIED ECONOMETRICS CONTENT

I. Getting Started
- The Model Specification Phase
  - The Principal of Parsimony
  - The Shrinkage Principle
- The Generic Single-Equation Linear Regression Model
  - Components of the Model
    - Endogenous Variables, Exogenous Variables, Lagged Exogenous Variables, Lagged Endogenous Variables
    - The Disturbance (or Error) Term
    - Assumptions of Econometric Models
- Data and Data Transformations
  - Data Types--Time-Series, Cross-Sectional, Combination
  - Getting a Feel for the Data--Plots of Key Variables, Scatter Plots, and Descriptive Statistics
  - Massaging the Data
    - Expression of Data--Nominal versus Real or Inflation-Adjusted Measures
    - Expression of Data--Total or Per Capita Terms
    - Expression of Data--Levels, Changes, or Percentage Changes
    - Use of Moving Averages or Exponential Smoothing
    - Adjustments for Seasonality
    - Imputations for Missing Data

II. Mathematical and Statistical Considerations
- Key Constructs in Applied Econometric Models
- Estimation of Structural Parameters in Applied Econometrics
  - Marginal Effects, Standardized Regression Coefficients. Elasticities, and Partial Correlation Coefficients
- Interval Estimation and the Construction of Confidence Intervals

III. Common Tests of Hypotheses
- Tests of Hypotheses Regarding Structural Parameters of Econometric Models
  - Statistical Distributions--Standard Normal, t, Chi-squared, and F
  - Level of Significance and p-Values
  - Goodness-of-Fit Test
  - Tests of Single Coefficients
  - Tests of Linear Combinations of Coefficients
- Additional Tests of Hypotheses in Econometric Models

- Test of Normality of the Residuals (the Jarque-Bera Test)
- Ramsey Regression Specification Error Test (the Ramsey RESET Test)
- Box-Cox Test (Test of Functional Form)
- Granger Causality Test (Test of Precedence)
- Hausman Test (Test of Endogeneity/Exogeneity of Explanatory Variables)

IV. Use of Indicator or Dummy Variables
- Overview (the Representation of Qualitative Variables in Applied Econometrics)

V. Autocorrelation or Serial Correlation
- Definition, Prevalence, and Consequences of Serial Correlation
  - Systematic Pattern in the Residuals
  - Positive Versus Negative Autocorrelation
- Formal Tests of Serial Correlation
  - Durbin-Watson Test
- Solution to the Serial Correlation Problem

VI. Heteroscedasticity
- Definition, Prevalence, and Consequences of Heteroscedasticity
  - Indigenous to the Use of Cross-Sectional Data
  - Examination of the Residuals--Graphical Depictions
- Formal Tests of Heteroscedasticity
- Solution to the Heteroscedasticity Problem
  - Application of Weighted Least Squares

VII. Collinearity
- Definition, Prevalence, and Consequences of Collinearity
  - Consequences for Structural Parameter Estimates and Forecasting
- Formal Diagnostics of Collinearity

VIII. Influence Diagnostics: The Detection and Assessment of Data Outliers and Leverage Points
- Definition and Consequences of Influence Points

IX. Structural Change and Stability of Structural Coefficients
- Abrupt Structural Change
  - Breakpoint(s)
  - Use of Sequential Chow Tests
- Formal Tests of Parameter Instability
  - Recursive Estimation
  - Recursive Residuals
- Solution(s) to Structural Change or Parameter Instability

- Attention to the Time Frame of the Econometric Analysis
- Use of Dummy Variables

X. Distributed Lag Models
- Overview of Distributed Lag Models

XI. ARCH and GARCH Models
- Overview of ARCH and GARCH Models
- Mechanics of the Autoregressive Conditional Heteroscedasticity (ARCH) Model
  - Stability Considerations
- Mechanics of the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) Model

XII. Qualitative Choice Models
- Overview of Qualitative Choice Models
- Binary Choice Models--The Probit Model
- Binary Choice Models--The Logit Model
- Estimation of Probit and Logit Models
- Calculation of Appropriate Marginal Effects
- The Prediction-Success Table

XIII. Censored Response Models

XIV. Pooling of Time-Series and Cross-Sectional Data
- Overview and Examples of Pooled Time-Series and Cross-Sectional Data
- To Pool or Not to Pool?
- Cross-Sectionally Heteroscedastic and Time-Wise Autoregressive Models
- Fixed and Random Effects

XV. Simultaneous-Equation Models
- Order Conditions for Identification
- Impact, Interim, and Total Multipliers

XVI. Stability Conditions of Simultaneous-Equation Models

XVII. Seemingly Unrelated Regression (SUR) Models

COMMUNICATION AND PRESENTATION SKILLS CONTENT

I. Introduction
   a. Welcome/Introduction
   b. Icebreaker
   c. Introduction/expectations
   d. Basic Facts
   e. Agenda/Objectives

II. Benchmark Presentation
   a. Benchmark Presentation, first taping: The group delivers their 3-5 minute presentations using whatever techniques they currently use
   b. One-on-one feedback sessions

III. Chapter One: The Presentation Process
   a. The Presentations Process
   b. The Presentation Process
   c. Presentation Planning: Audience Analysis
   d. Activity 1.1: Presentation Purpose
   e. Presentation Planning: Situation Analysis
   f. Activity 1.2: Presentation Planning

IV. Chapter Two: Tools of Communication
   a. 3 Vs of Communication
      i. visual
      ii. vocal
      iii. verbal
   b. Stress Reducers

V. Chapter Three: Delivery Skills
   a. What Does It Take to Be Great?
   b. The Presentation Process Overview (Introduction)
   c. Steps for Control/Essential Presentation Skills
      i. litany technique
      ii. eye contact
      iii. power position
      iv. facial expressions
      v. dress

VI. Chapter Four: Visual Aids
   a. Types of Visual Aids
   b. Presenting Data

c. Presentation Software

VII. Chapter Five: Rhetorical Devices
   a. Activity 5.1: Rhetorical Devices Activity
   b. Activity 5.2: Rhetorical Planning/Presentation. Second taping: The group delivers their 2-3 minute opening presentation practicing techniques learned
   c. One-on-one feedback sessions

VIII. Chapter Six: The Opening, Body, & Conclusion
   a. Rules of Communication
   b. The Opening
   c. The Body
   d. The Conclusion

IX. Chapter Seven: The "ASIA" Overview
   a. Presentation Process "ASIA" Overview Activity
   b. 7.1-ASIA Activity: Presentation Process "ASIA" Planning/Presentation. Participants finish up their ASIA openings and review with a partner or triad.
   c. Final Presentation: ASIA PRACTICE
   d. Second Taping: The participants deliver their final presentations using the body & closing, minus the opening. They are videotaped and feedback forms are distributed at this time

X. Chapter Eight: Q & A - Handling Difficult Questions
   a. Handling Difficult Questions
   b. The Technique
   c. Exercise: Tough Questions
   d. 8.1 Activity: Common Group Problems
   e. Dealing with Group Problems

I. U.S. Financial Accounts

- Flow matrix
  - Sources
  - Uses
  - interpretation of data
  - Sectors
    - Households and nonprofit organizations
    - Nonfinancial business
    - Governments
- Instrument categories
  - Instrument tables
  - Discrepancies in the financial accounts
- Integrated macroeconomic accounts
  - Agencies involved in production and publication
  - Conceptional basis and structure of the accounts
    - SNA methodology
    - Sectors
- Uses of the financial account
- As economic indicators of the economy
- Ratio of household net worth to disposable personal income
- Ratio of corporate and home equity to disposable personal income

II. International Statistics and the Balance of Payments

- BEA International Accounts
- International Transactions Accounts (ITAs)
  - Recognizing BPM5 and BPM6
  - Balance of payments accounts
    - Conceptual data reported
    - Relationship to economic conditions
  - Current account
    - Goods and services
    - Income
  - Financial account
    - What it measures
  - Classifications of data
  - Importance to understanding the economy
- International Investment Position (IIP)
  - Conceptual data reported
  - What data tells us

III. Measuring Employment

- Bureau of Labor Statistics
    - Employment Statistics
        - Employment Situation
            - Current Population Survey (CPS), Household Survey
            - Current Employment Statistics (CES), Payroll Survey
            - Differences in definitions/coverage
- Household survey
    - Survey design and methodology
        - Data collection
        - Unemployment Rate, Demographic detail
        - Seasonal adjustment
        - Sample size, Confidence intervals
        - Data revisions and benchmarking, pop controls
    - Civilian Noninstitutional Population, participation rate
        - Definition (16yrs and greater etc)
    - Labor force, including not in the labor force
        - Concepts (labor force, not in the labor force, discouraged workers)
        - Characteristics
        - Recent trends
    - Employment in household survey
        - Concepts
            - Employed persons (not jobs), Employment-population ratio
        - Characteristics of the employed
            - Demographic Characteristics
            - Involuntary part-time for economic reasons
    - Unemployment
        - Concepts (unemployment, unemployment rate)
        - Characteristics of the unemployed
        - Alternative measures of labor underutilization (U1-U6)
        - Duration of unemployment
        - Local Area Unemployment Statistics (LAUS)

IV. Measuring Employment

- Payroll survey (Current Employment Statistics)
    - Survey design and methodology
        - Data collection
        - Estimation methodology
            - Birth/death estimates
        - Seasonal adjustment
            - X12 ARIMA Concurrent seasonal adjustment
            - Impact of Financial Crisis, intervention
        - Data revisions and benchmarking
    - Major uses of CES data
- Household and payroll survey comparison

V. **Measuring Inflation**

- Agency collecting and reporting
- Building blocks of the BLS CPI
    - Weighting: sources and updates
    - Data collection
        - Outlet visits
            - Disaggregation process
            - Sample period
            - Definition of price
        - Housing
            - Rental Equivalence
    - Estimating CPI
        - Stages of estimation
            - Stage 1: Laspeyres/Geometric mean
            - Stage 2: Laspeyres
        - Quality adjustment
        - Seasonal adjustment
- Comparison of CPI Measures: CPI-U, CPI-W, CPI-E
- Chained CPI-U
    - Substitution and weighting
    - Chained CPI-U as a cost of living measure

VI. GDP and the National Income and Product Accounts

- What questions do the NIPAs address?
- How are the data used?
- Domestic income and product account (Account 1)
    - Gross domestic income and components
    - Gross domestic product
        - Expenditure categories
            - Shares
    - Relationship between GDP and GDI
- Income and outlay accounts (Accounts 2-4)
    - Personal income and components
    - Corporate profits and components
- Foreign transactions account (Account 5)
- Capital account (Accounts 6 and 7)
    - Domestic saving and investment
    - International financial transactions
        - Current account
        - Capital account
- Price measures and inflation adjustments (chaining)

VII. Productivity

- Importance to the economy
- Measures of productivity
    - Labor productivity
    - Multi-factor productivity
- Productivity concepts of output
- Productivity concepts of inputs
- Changes in productivity
- Productivity and costs news release
    - Measures reported
        - Output per hour
        - Compensation per hour
        - Unit labor costs
        - Headline measures
    - Calculating labor productivity and unit labor costs
- Industry labor productivity
    - Importance
- Multifactor productivity
    - Measuring inputs
- Finding the data

MACROECONOMICS CONTENT

I. Fundamental Relationships and Tools:
- National income accounting
  - Know how GDP estimates are produced
  - Aggregate identities
    - Income side and Product side Accounting
- Economic indicators
  - Interpret the economic indicators as they relate to the economic forecast
  - Time series Analysis "basics"
    - Stock and Flow relationship
- Saving Investment relationship
- Sources of Inflation
- Measurement of Inflation
  - Chain Measures - Fixed Weight
  - CPI, PPI, Deflaters, Employment Cost Index, Indexation, etc.
  - Notion of Core Inflation

II. International Trade and Finance
- Exchange rate determination
- Trade flows/balance
- Financial linkages/contagion
- Purchasing Power Parity

III. Static Models/Frameworks:
- Basic Model Building Concepts
  - Expenditure relationships
  - Multiplier concepts
- IS/LM model
- Aggregate demand and aggregate supply
- Aggregate output and production function

IV. Fiscal Policy
- Stabilization policy

V. Inflation Dynamics
- Philips curve
- Natural rate hypothesis
- Quantity theory of money

VI. Money and Monetary Policy:
- Money, banking, and credit
- Money and credit creation

    - Reserve banking system/money multiplier
- Monetary Policy
- Targets and instruments
- Traditional vs. Non-traditional monetary tools
- Monetary rules and inflation targeting
    - Taylor "type" Rules

VII. (Macro/Finance)

- Money market instruments
    - Fed Funds, Libor, Commercial Paper
- Debt instruments
    - basics of treasuries, corporates, derivatives and structured products
- Term structure of interest rates
- Various measures of credit spreads
    - TED, Yield Spread in Leading Economic Indicators
- CAPM/Cost of Capital

VIII. Dynamic Models and Long-term Growth:

- Growth Accounting
- Overlapping generations
- Life-cycle optimization
- Real business cycle

IX. Business Cycle Analysis:

- NBER (Nat'l Bureau of Economic Research) Business Cycle Dating Committee
- Definitions of the Business Cycle
- Theories of the business cycle
- Consumption theories
    - Consumption and Saving
    - Permanent Income Hypothesis
- Investment cycle
    - Investment and inventory theories
- Inventory cycle

MANAGERIAL ECONOMICS CONTENT

I. Introduction and Basic Concepts
- The firm
- Froeb and McCain
  - Making decisions at the margin
  - Ignoring sunk costs
- Nature of costs and measuring costs
  - Explicit versus implicit costs
- Accounting profit vs. economic profit.
  - Computing economic profit
- Compute present value of a future amount
- Optimizing techniques
- Adhere to the NABE Code of Ethics

II. Supply and Production
- Organization of production
- The role of transaction costs in determining the vertical boundaries of the firm
  - Boundaries of the firm and transaction costs,
  - Getting the make vs. buy decision wrong
  - Topics in the supply chain
    - Domestic vs. foreign: trade vs. FDI
    - Vertical vs. horizontal international choice
- Long run average costs
- Minimum Efficient Scale
- Economies of scope and the factors that contribute to it

III. Estimating Cost Functions and Production Functions
- Short run costs
- Functional Forms
- Estimating cost functions
- Estimating the efficient plant size in an industry
- Learning Curve
- Break-even analysis
  - Principles of break-even analysis
  - Resolving measuring issues
  - Contribution margin
  - Operating leverage

IV. Financing the Firm
- Long run investment decision and capital budgeting
  - Measuring the cost of capital

        - Capital structure of the firm – WACC
        - Project finance – cash flows, cost of capital, NPV, IRR, and payback criteria
    - Risk and Uncertainty in Decision-Making
        - Defining and measuring risk
        - Utility theory and risk aversion
        - Adjusting asset valuations for risk
        - Making investment decisions under uncertainty

V. Analysis of Demand
    - Price elasticity of demand
        - Using direct estimation
        - Using a linear demand function
        - Using a log-linear demand function
        - Using a logit model
        - Using the mltinomial logit model
    - Individual estimates and aggregating demand
    - Other elasticities
        - Cross-price
        - Income
    - Advertising elasticity of demand
    - Measuring key demand factors/data sources
        - Internal price data collection/tracking promotions
        - Competitor price/volume data
        - Survey data/consumer research
        - Seasonality and "events"
    - Demand forecasting – quantitative techniques
        - Regression models – single equation
    - Demand forecasting – qualitative techniques

VI. Pricing
    - Pricing basics
        - Price-taking in perfect competition
        - Price-setting in less than perfectly competitive markets
        - Cost-plus pricing
    - Complex pricing issues
        - Commonly-owned substitutes
        - Commonly-owned complements
        - Yield management
        - Promotional pricing
    - Efficient pricing: assumptions and examples
        - Fundamentals
        - Perfect price discrimination
        - Customer segmentation pricing
        - Two-part tariff/multi-part pricing
    - Legal issues around pricing

- Resale price maintenance
- Predatory pricing/dumping

- Pricing within the firm: transfer pricing

VII. Market Structure and Strategic Behavior

- Defining the relevant product and geographical markets for good or service
- Assessing a market's structure and competitiveness of an industry
  - Concepts and measurements
    - Concentration measures
    - Scale economies and entry conditions
- Decision Tree
  - Analyzing choices through decision trees
- Applying game theory models to business situations
  - Technical concepts
    - dominant strategy

VIII. Regulation

- Externality and the difference between private and social benefits and costs
- Correcting the misallocation of resources that comes from externalities.
- Antitrust
- Regulatory review process of a proposed merger
- Restraints of trade
- Other Regulation
  - Public utility regulation
- Executive Order 12866
- Analyzing regulation

MICROECONOMICS CONTENT

I. Theory of Consumer:

- Utility Maximization
  - Marginal Utility
  - Marginal Rate of Substitution (MRS)
  - Opportunity Cost
- Demand Functions and Choice
  - Change in demand/supply v. change is quantity demand/supply
  - Income and Leisure
  - Substitution and income effects
  - Demand Elasticities
    - Elastic, inelastic, unit elastic
    - Relationship between unit elasticity and total revenue
    - Relative price
  - Other Elasticities
    - Cross Price
    - Income Elasticities
- Consumer Surplus

II. Theory of the Firm:

- Production Functions (Cobb-Douglas, etc.)
  - Marginal Product
    - Law of Diminishing Returns
  - Returns to scale
- Cost Function
  - Types of Costs
    - Total cost
    - Fixed Costs
    - Variable Costs
    - Marginal cost
    - Average cost
- Short Run vs. Long Run
    - Sunk cost
    - Economies of scale
- Profit Function
  - Profit Maximization
    - Producer Surplus
    - Time and Inter-temporal Preferences

III. Market Equilibrium:

- Supply
  - Changes in Quantity Supplied
- Changes in Supply

        - Changes in input Price
        - Changes in Technology
        - Expectations
    - Demand
        - Changes in Quantity Demand
        - Changes in Demand
            - Demographic
            - Income
            - Expectations
    - Equilibrium

IV. Distortions to the Market:
- Price Ceilings
- Floors
- Quotas
- Taxes
    - Tax Incidences
- Subsidies
- Deadweight Loss

V. Market Structure:
- Competitive Markets
    - Perfect competition
        - Firm's price and output decision in the short-run
        - Firm's price and output decision in the long-run
        - Short-run market supply
        - Firm entry/exit
        - Economic profit
- Monopoly
    - Barriers to entry
    - Market concentration
        - Firm's price and output decision
        - HHI
        - Definition of a firm's market
        - Economic profit
- Oligopoly
    - Nash equilibrium
    - Duopoly
- Monopolistic Competition
    - Product differentiation
        - Entry and exit
        - Firm's price and output decision in the short-run
        - Firm's price and output decision in the long-run
        - Economic profit

VI. Externalities and Public Goods:
- Public goods

    - Free Rider Problem
    - Tragedy of the Commons
    - Market/government failure
- Externalities
    - Information (principal agents, moral hazard, etc.)
    - Property Rights
        - Coase Theorem
    - Private and Social Costs
- Risk and Uncertainty
    - Uncertainty
    - Risk
        - Expected Value
        - Firm Beta

STATISTICS AND DATA ANALYTICS CONTENT

I. Introduction to Statistics
- Key Points
  - Variability is everywhere.
  - There are ethical considerations.
  - Quality is paramount!

II. Basic Probability, Sampling, and Survey Methods
- Basic Probability
- Probability of Two or More Events
  - Rules of Addition
  - Rules of Multiplication
- Bayes' Theorem
  - Sampling
  - Simple Random Sampling
  - Systematic Random Sampling
  - Stratified Random Sampling
  - Sampling Error
- Probability Distributions
  - Normal Distribution
  - t-distribution
  - f-distribution
- Survey Methods
  - Sample Selection
  - Instrument Design
  - Data Collection
  - Data Analysis

III. Data, Data, Data!
- Data Characteristics
  - Quantitative and Qualitative
  - Ordinal, Interval, Ratio
- Dataset Structure
  - Cross-section, Time Series, Panel
- Getting to Know the Data
  - Housekeeping (Cleaning and Coding)
  - Inflating and Indices
    - Creating an Index
  - Annualized Percent Change
- Distribution
  - Testing for Normality

        - Examining Graphically
    - Testing for Outliers
        - Simple Outlier Statistic
        - Boxplot
- Descriptive Statistics
    - Range, Median, Mode, Mean, Variance, Standard Deviation, Quartiles
    - Weighted vs Unweighted
    - Adjusted Weights
- Big Data
    - Analysis
        - Build a Sensible Dataset

IV. Analytical Tools

- Areas Under the Curve
- Confidence Intervals
    - population mean
    - population proportion
- One-Sample Hypothesis Testing
    - Population mean testing (standard deviation unknown)
    - Population mean testing (standard deviation known)
    - Testing for proportion
    - One-tail versus Two-tail tests
- Two-Sample Hypothesis Tests
    - Paired (Dependent) Samples
    - Other (Test of Means, Standard Deviation Known; Test of Means, Independent Samples)
- Regression Analysis
    - Regression Equation
    - Coefficient Estimates
    - Correlation Coefficient
    - Coefficient of Determination
    - Statistical Significance (p-values)
    - ANOVA (SSR, SSE)
    - Standard Error of the Estimate
    - Error Structure
- Multivariate Regression
    - Coefficient Estimates
        - Comparison to Simple Linear Regression Estimates
    - Coefficient of Determination
    - Statistical Significance (individual vs global)
- Discrete Methods
    - Probit
    - Logit

V. It's Not Just About the Numbers

- Planning a Project
  - Client Considerations
- Communicating the Need for a Formal Statistical Process
- Communicating Results Effectively
  - Point Estimates
  - Forecasting
- Communicating Technical Concepts
  - Causality vs Correlation
  - Functional Form
  - Elasticity

VI. Common Errors and Diagnostics
- Concerns Regarding Hypothesis Testing
- Regression Diagnostics
  - Perfect Collinearity
  - Multicollinearity
  - Endogeneity
  - Heteroskedasticity
  - Autocorrelation
- Model Sensitivity and Full Disclosure
- Common Sense vs Statistical Sense

VII. Additional Applications
- Monte Carlo Simulation

WRITING SKILLS CONTENT

I. The Role of Writing in Business

a. Goals and strategies for different forms of business writing
   i. Writing with the ability to convince your audience that your conclusions are correct
   ii. Using a Straw Man – compare and contrast
   iii. Writing with a corporate objective – call to action for leadership
   iv. Understanding why and how to translate obscure economic jargon into the language of your business
   v. Structuring the end product within the time available (meeting deadlines)

b. Understanding the different forms of business writing (for economists) and the ideas and rationales behind choosing the right format
   i. Memos
      1. Different types of memos
      2. How to structure a memo
   ii. White paper (non-technical)
   iii. Executive summaries
   iv. Blog posts
   v. Industry reports
   vi. Project manager updates

c. Identifying your audience, voice and the best way to get your point across
   i. CEO/Supervisor
   ii. Clients
   iii. Consumers
   iv. Other economists
   v. Government Regulator

d. Hazards of writing in the wrong form or voice
   i. Failure to get your point across
   ii. Too technical, consumers may not understand your message

II. Organizing Your Document

a. Including appropriate information
b. Organizing the information (techniques)
c. Incorporating a benefit statement
d. Selecting headers that clearly signal the conclusion and action desired

III. Writing from Strength

a. Choosing an active voice
    i. how to use simple language and action verbs
b. Varying sentence structure
    i. how to write a topic sentence and paragraph
c. Editing your work
    i. editing tools and how to assert quality control over others' work
    ii. techniques for editing technical work
d. Using best practices and tricks of the trade
e. Focusing on the message

IV. How to integrate data into writing (text)

a. Percent versus percent. change
b. Using a systematic approach to including numbers
c. Including numbers in parenthesis
d. Identifying when to incorporate charts and graphs within text versus appendix
e. Explanation of data analysis, e.g., meaning of correlation
f. Using the appropriate statistics for a specific audience
g. Determining the appropriate level of technical data based on audience

V. Avoiding Pitfalls

a. Failing to make your point
b. Using bureaucratic-speak or too casual a style
c. Using a negative voice
d. Using complex sentences
e. Avoiding common grammatical and punctuation errors
f. Understanding the importance of brevity
g. How to search for synonyms and create elegant variations
h. How to avoid repetitiveness