UNIVERSITY of MASSACHUSETTS DARTMOUTH
Charlton College of Business
Decision and Information Sciences

COURSE: **Statistical Analysis, POM-500**

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1. COURSE DESCRIPTION

This one-semester course examines descriptive and inferential statistics with applications to quality as applied to business. It takes an applied approach that focuses on the concepts and applications of statistics to functional areas of accounting, economics, finance, management and marketing. Throughout this course students will utilize appropriate computer software to perform statistical analyses. In your future careers, you will be using computers to interpret and analyze data on the job; therefore an emphasis will be placed on concepts, applications & interpretations. Students will learn how to make decisions using facts & and data analysis. The course examines descriptive statistics & inferential statistics focusing on measures of central tendency, dispersion & probability; continuous, discrete, normal and sampling distributions; estimation, hypothesis testing, analysis of variance, regression & correlation analysis, & enumerative studies. Emphasis is on applications of statistical concepts as practiced in business. Students will also utilize the internet for real-life database problems, homework & practice exams.

2. COURSE OBJECTIVES

This course will examine basic statistical concepts. Emphasis will be given to the understanding of measures of central tendency, variation and basic probability distributions and confidence interval estimations. The course is aimed at organizing data, interpreting statistical charts and estimating. The focus of topics is concentrated on the ability to interpret numerical data as related to business.
From this course you will:

- Be able to utilize appropriate computer software to conduct statistical analyses
- Be introduced to basic probability and probability distributions.
- Be introduced to estimation techniques.
- Be introduced to methods of hypothesis testing.
- Be introduced to the importance of tables and charts for business decision making, understand how charts can improve processes and be able to utilize charts to summarize data from continuous or discrete variables.
- Understand how to apply rules of basic probability, probability distributions and their characteristics, such as Binomial, Poisson, Normal and Sampling Distributions.

- Understand how to perform tests of hypotheses and decision theory.
- Be able to develop statistical thinking with the understanding and management of variability; recognize different types of variables and levels of measurement and statistical sampling principles from business applications.
- Be able to work with tables and charts for Business & Industry attribute data.
- Be able to calculate measures of central tendency and dispersion and their graphical representations.
- Be able to make interpretations as applied to business topics.
- Be able to develop interval estimates of the population mean and proportion utilizing confidence interval methods along with applied interpretations.
- Be introduced to methods of regression & correlation analysis
- Be introduced to the Analysis of Variance and Experimental Design
- Be able to perform an Analysis of Variance; one factor design, block & two way factorials
- Be able to apply a statistical technique to a real-life applied case project.
- Be able to utilize appropriate computer software to conduct statistical analyses
- Understand how to utilize the regression model for predicting/forecasting in Business applications. Forecast for one variable based on one or more independent variables and examine the assumptions.
- Understand how to utilize hypothesis-testing techniques to test Business Applications.
- Understand how to utilize statistical software on the computer and interpret results.

3. COMPETENCIES AND CONTACT HOURS

Competencies ***The student will be introduced to statistical thinking, definitions, techniques of organizing and describing information, estimating and testing. The student will understand:***	**Contact Hours**	
• **Why one needs to know about statistics?**	1	1
• **Descriptive vs. Inferential statistics**		
• **Variables, Types of Data & Levels of Measurement**	1	2
• **Frequency Distributions, Relative Frequency & Percentage Distributions with Histograms & Polygons**	1	3
• **Use of Microsoft Excel for Tabular & Graphical Summary**	1	4
• **Measures of Central Tendency**	1	5
• **Measures of Variability & Shapes of Distributions**	2	7
• **The probability Distribution, expected values and deviation**	1	8
• **Binomial Distribution**	2	10
• **Poisson, & Hypergeometric Distributions**	2	12

Competencies ***The student will be introduced to statistical thinking, definitions, techniques of organizing and describing information, estimating and testing. The student will understand:***	**Contact Hours**	
• **Uniform, Normal, Exponential distributions**	3	15
• **T, F, & Chi-Square distributions**	1	16
• **Central limit theorem**	2	18
• **Confidence Interval for a Mean, Sigma and proportion**	2	20

•	**Hypothesis Testing of mean, sigma, & proportions**	3	23
•	**Chi Square Goodness of Fit Test**	2	25
•	**Test of Independence**	1	26
•	**Analysis of Variance**	3	29
•	**The development of the Simple Linear Regression Model**	3	32
•	**Regression & Correlation with Microsoft Excel**	2	34
•	**Design of Experiment concepts**	2	36
•	**Design and analysis of experiments**	3	39
•	**Full factorial & fractional factorial designs**	2	41
•	**Analysis with Microsoft Excel**	1	42

The student will be able to:

- Develop an understanding of basic statistical concepts
- Be aware of misuse of data
- Summarize data using graphical, tabular and numerical measures of central tendency & dispersion
- Calculate the probability of an event
- Use discrete and continuous statistical distribution for analyzing and solving business problems
- Estimate a parameter with a confidence level
- Calculate margin of error for point estimates
- Perform the appropriate hypothesis test for a mean, sigma & proportion
- Study relationship between two or more variables
- Design full factorial experiments and perform Analysis of Variance test & interpret results from appropriate computer software analysis
- Analyze a case study by organizing the information by utilizing the descriptive measures and probabilities.
- Collect information, describe, test and interpret the results from appropriate computer software.

4. COURSE MATERIAL

Text (Optional): Business Statistics
Ken Black, Wiley
Handouts: Provided by instructor
Calculator
Statistical Software: Excel; SPSS for Windows
myCourses: PowerPoint slides of the handouts are available at myCourses

5. UNIVERSITY CLASSROOM POLICIES

Academic Honesty: Students are expected to participate in the course within the guidelines of the Academic Ethical Standards published in the General Catalogue. Instances of academic dishonesty will be penalized to the greatest extent possible. Plagiarism is a serious offense.

To help you maintain academic integrity, the Carney Library offers many resources including http://www.lib.umassd.edu/get/refworks.html, the link to Refworks, a bibliography and database manager, as well as guides on using MLA, APA, and other citation standards. Before you write any paper, you should review the guides on Avoiding Plagiarism: http://www.lib.umassd.edu/find/plagiarism.pdf or http:/www.lib.umassd.edu/find/plagiarism.pdf.

Students with Disabilities: Disabled Student Services (DSS) provides support to both learning and physically disabled students. If you have a disability that requires accommodation you should contact DSS. If you have a documented disability and require accommodations to obtain equal access in this course, please meet with the instructor at the beginning of the semester and provide the appropriate paperwork from the Center for Access and Success. The necessary paperwork is obtained when you bring proper documentation to the Center for Access and Success, which is located in Group I (Liberal Arts Building), Room 016, and phone: 508-999-8711.

Incomplete: According to the university catalogue, an incomplete may be given only in exceptional circumstances, at the instructor's discretion. The student must be passing at the time of the request, or sufficiently close to passing. If the work is not completed within one year of the recording of the incomplete grade, the grade will become an F (I). The incomplete policy for this course is that at least 80% of the course must be complete and an exceptional circumstance (for example, a medical issue) must exist. If you feel you require an incomplete for an exceptional reason, you need to email me and state your reasons for the incomplete in writing. I will then decide whether to consider granting the incomplete. If I agree to consider it, we will then have to meet to work out a specific course of action.

Link to all the student support services for UMassD:
http://www.umassd.edu/extension/studentresources/

6. COURSE POLICIES

Communication: When communicating via email (my email ID: brai@umassd.edu), make sure to include POM 681 in the subject area. Response time is expected to be within 24 hours.

Late assignments: This being an online class, it is extremely critical to complete you work as per the schedule. To encourage on-time submissions and to ensure you don't fall behind too much, assignments that are submitted after the due date will lose 50% points.

Proper grammatical writing: Make sure to use proper grammar in assignments that are submitted. Use of writing language that are common in instant text messaging will cause deduction of points.

Feedback: Assignments submitted on-time will be graded before the due date for next assignment and appropriate feedback will be provided.

7. E-PORTFOLIO REQUIREMENT FOE MBA STUDENTS:

All MBA students must develop and maintain an ePortfolio as a requirement of the program (non-degree students and MGT certificate students are exempt from this requirement). ePortfolio accounts should be purchased through the online campus bookstore (http://umdcampusstore.com/MerchList.aspx?ID=6081).

Artifacts from this class that must be uploaded include: (you specify any assignments that are done as doc, xls, ppt, jpg. files that are significant enough to show student learning. Alternatively just put an asterisk next to those assignments on the syllabus). Artifacts must be linked to one or more appropriate learning goals (i.e., problem-solving/analytical thinking, technology/information literacy, written communication, global awareness, ethics, management of a business enterprise). Students must write a short reflection at the beginning of each of the learning goal sections that: 1) states what the learning goal is about, 2) which artifacts (by file name) relate to the learning goal, and 3) a brief description of the artifact . After uploading the artifacts, students must "SHARE" the information with me so I can review it. Students not completing the ePortfolio requirement will receive and incomplete in this course.

Further information on the ePortfolio can be found at:
http://www.umassd.edu/charlton/eportfolio including training locations and times, phone numbers and emails for technical help, and the student user manual.

8. EVALUATION POLICY:

Tests:

There will be three tests throughout the semester, which will be announced at least one week in advance.

Online Quiz:

There will be several online quizzes available on myCourses after the completion of each chapter. The online quizzes needs to be finished before the corresponding test. The online quizzes will not be available after the test.

Homework:

For homework assigned in a class, a due date will be indicated. On-time homework submissions will be graded out 100% and those submitted late will be graded only out of 50%.

Presentation:

Details available on course website.

These test results, online quizzes, homework, and project scores will determine your grade for the course. Given below is the break-up.

Evaluation Type	Score
Tests (3)	50%
Online quiz on myCourses	20%
Homework Assignments	20%
Presentation	10%
TOTAL	100%

9. FINAL GRADES

Final grades would be determined based on all items discussed above with weightings as indicated. Unexcused absences from the class would have adverse impact on the final grade. The course contents are designed to help you to be successful in your current or future profession. And therefore to pass this course, a student must develop and demonstrate basic understanding of the statistical concepts, and good comfort level in interpretation and application. Given below are the grades based on the final course score:

Grade	*Final Score (%)*
A-, A, A+	90-100
B-, B, B+	80-89
C-, C, C+	70-79
D-, D, D+	60-69
F	00-59

10. CLASS SCHEDULE*

Topics
1. Introduction to course; Data and Statistics; Types of data; Scales of measurement: Nominal, Ordinal, Interval and Ratio; Misuse of Data;
2. Tabular and Graphical summary of data; Different patterns of a histogram; Use of PivotTable in Excel; Numerical summary of data; Measures of central tendency and variability;
3. Population versus sample; Sampling methods Discrete Distributions: Binomial experiments, Binomial Distribution; Use of Microsoft Excel functions; Simulating Binomial experiments; Poisson Distribution; Hypergeometric Distribution;
TEST #1 based on Topics 1 – 3 **Items Due before test → Homework Assignment-1; Quiz-1, 2, & 3**
4. Continuous Distributions: Uniform, Normal, & Exponential Distribution; T, F, & Chi-square Distributions;
5. Central Limit Theorem; Confidence Intervals for Mean, Sigma, and Proportion; Hypothesis Testing...contd.
6. Central Limit Theorem; Confidence Intervals for Mean, Sigma, and Proportion; Hypothesis Testing
TEST #2 based on Topics 4 – 6 **Items Due before test → Homework Assignment-2; Quiz-4 & Quiz-5**
7. Analysis of Variance Calculations and Interpretations;
8. Introduction to Design of Experiments (DOE); Steps in DOE; Full-Factorial & Fractional Factorial Designs; Exercises;
9. Simple Linear Regression Model; Least squares method; Sample correlation coefficient; R-square; Regression with Microsoft Excel and interpretation of regression equation & ANOVA output;
TEST #3 based on Topics 7 – 9; **Items Due before test → Homework Assignment-3; Quiz-6**

*The class schedule is tentative, and is subject to change at the instructor's discretion.