LSP 121
Quantitative Reasoning and Technological Literacy II

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Course Description
In this course, students will continue the study of issues in the sciences, social sciences, and management in which quantitative data plays a significant role. This second course in QRTL, however, will emphasize more the role of computer technology. Extensive use will be made of computer tools such as Access, programming environments, Word, and Excel.

Learning Outcomes for LSP 121 (QRTL):

1. Statistics: Students will be able to make and interpret frequency distributions; summarize data with measures of center and dispersion; measure and interpret the association between variables; recognise the difference between correlation and causation; solve applied problems involving the normal distribution and z-scores.

2. Probability and Chance: Students will be able to recognize that seemingly improbably coincidence is not uncommon; evaluate risk from available evidence; and calculate basic, common probabilities.

3. Algorithms and reasoning: Students will be able to use sequential, logical thinking; develop algorithms to solve problems; use Boolean conditionals and repetition structures to create simple computer programs.

4. Database tools: Students will be able to enter data into a pre-existing database; import data from a text file or spreadsheet file into a database; filter records based on a single parameter and on multiple parameters; sort records with multiple sort keys; formulate and conduct queries; generate a report from a database; recognize the difference between a flat file and a relational database; create a relational database using two or more tables; construct a query for a relational database using joins; design and implement forms for data entry.

5. Professional Statistical Package: Students will be able to import data from a spreadsheet or database into a statistics package (EXCEL); use graphical tools in a statistical package to make specialized statistics plots such as box plots and normal probability plots; calculate descriptive summary statistics using Excel.

6. Programming tools: Students will be able to construct the concept of algorithm through experimentation and reflection on everyday activities; articulate an accurate definition of an algorithm; recognize algorithms fitting the definition; construct the notion of a control structure and a repetition structure; acquire the ability to trace simple program listings using control and repetition structures; use control and repetition structures to write simple computer programs to effect a task.

How These Learning Outcomes Will Be Met:

1. Database
   a. DB MODULE 1 Database Design will introduce database design starting with the basic building blocks of themes, attributes and instances and continuing through relationships and the elements necessary to creation of a relational database. We will briefly touch on the history of databases with a very short video, the motivations behind choosing to implement a relational database, and a brief but useful introduction to documenting database designs. In addition to reading assignments and MP4-based lectures, there are two Practice Problems with detailed solutions which provide practice with these concepts. Once these learning materials have been covered, a required unit summary consisting of five short answer questions related to the material in this module, two required projects applying the concepts in this module and one extra credit project which can be completed when all required work has been submitted.
   b. In DB MODULE 2 Database Implementation, students will work with MS Access to implement the concepts learned in DB Module 1: Database Design. We will start with an introduction to the basic MS Access activities involved in defining a database: tables, attributes and relationships. At this time, we will also address questions of data types, data integrity and referential integrity. Once we have covered those, we will learn four ways to populate a database (including use of forms and subforms), how to make queries (single and multiple tables) and how to generate and edit reports. In addition to the reading assignments and MP4-based lectures, there is one Practice Problem with a detailed solution, and four Practice Exercises with both solutions and MP4 solution walk-throughs to provide practice with the concepts learned in this module. Once these learning materials have been covered, a required unit summary consisting of five short answer questions related to the material in this module, two required projects applying the concepts in this module and one extra credit project which can be completed when all required work has been submitted.
2. Probability and Statistics
   a. In PS MODULE 1 USEFUL STATISTICS, students will learn about normal distributions and useful facts about data that is normally distributed. They will learn, using EXCEL, how to calculate and use the mean, mode, median, range, and standard deviation plus variance, z-scores, percentile and quartile values. In addition to the reading assignments and MP4-based lectures, there are two Practice Exercises with both solutions and MP4 solution walk-throughs to provide practice with the concepts learned in this module. Once these learning materials have been covered, the student will have a required unit summary consisting of five short answer questions related to

the material in this module, two required projects applying the concepts in this module and one extra credit project which can be completed when all required work has been submitted.

b. In PS MODULE 2 COMMUNICATING RESULTS, students learn how to organize the results of their statistical analyses in order to best communicate the results to others. They will understand histograms, pivot tables and crosstabs and learn to use EXCEL to generate these. In addition to the reading assignments and MP4-based lectures, there are two Practice Exercises with both solutions and MP4 solution walk-throughs to provide practice with the concepts learned in this module. Once these learning materials have been covered, the student will have a required unit summary consisting of five short answer questions related to the material in this module, two required projects applying the concepts in this module and one extra credit project which can be completed when all required work has been submitted.

c. In PS MODULE 3 OTHER USEFUL MATHEMATICS, students learn to determine correlations and probabilities using EXCEL. They will learn to calculate and use logs, calculate risks and perform unit conversions. And they will learn the concepts of non-decimal math and how to use it. In addition to the reading assignments and MP4-based lectures, there are two Practice Exercises with both solutions and MP4 solution walk-throughs to provide practice with the concepts learned in this module. Once these learning materials have been covered, the student will have a required unit summary consisting of five short answer questions related to the material in this module, two required projects applying the concepts in this module and one extra credit project which can be completed when all required work has been submitted.

3. Algorithms and Programming
   a. In CS MODULE 1 INTRODUCTION TO PROGRAMMING the student is introduced to the concept of algorithms and rudimentary computer programming. We use the SCRATCH program designed by MIT to learn programming concepts. There is a presentation and tutorial as well as the SCRATCH videos on the website. Coding will include using variables, messaging, looping and conditionals. In addition to the reading assignments and MP4-based lectures, there are two Practice Exercises with both solutions and MP4 solution walk-throughs to provide practice with the concepts learned in this module. Once these learning materials have been covered, the student will have a required unit summary consisting of five short answer questions related to the material in this module, two required projects applying the concepts in this module and one extra credit project which can be completed when all required work has been submitted.

   b. In CS MODULE 3 IMPORTANT COMPUTER CONCEPTS the student will learn about error checking on Data Transmission and data encryption. In addition to the reading assignments and MP4-based lectures, there are two Practice Exercises with both solutions and MP4 solution walk-throughs to provide practice with the concepts learned in this module. Once these learning materials have been covered, a required unit summary consisting of five short answer questions related to the material in this module, two required projects applying the concepts in this module and one extra credit project which can be completed when all required work has been submitted.

4. **Writing Expectations:** (these assignments overlap with those given in LSP 120)

Five computer activities each of which has a final product in the form of a Word document with five to ten short paragraph responses.

Five class assignments with approximately 10 short paragraph responses.

How These Writing Expectations Will Be Met:

Each of the seven modules has a required unit summary assignment with five questions requiring short paragraph responses which are to be submitted in the form of a Word document.
In addition, DB Module 1, PS Modules 2 and 3, and CS Modules 1 and 2 have required project assignments requiring short paragraph responses which are to be submitted in the form of a Word document.

Required Materials/Software
Microsoft ACCESS, Microsoft EXCEL

Textbook: none

Prerequisites: LSP 120

If you feel you already know the materials presented in this course, there is a placement exam you may take. You must take this exam within the first week of classes to waive the course this quarter. If you pass this exam, you will be waived from taking this course. Consult the qrc.depaul.edu website for more details.

Grading Scale:

92 - 100	A
90 - 91	A-
88 - 89	B+
82 - 87	B
80 - 81	B-
78 - 79	C+
72 - 77	C
70 - 71	C-
68 - 69	D+
60 - 67	D
0 - 59	F

Objectives of Course:

This Quantitative Reasoning and Technological Literacy course is designed to help you to become a more confident, critical, and capable user of quantitative information of all kinds. In particular, it will help you to

- continue to critique quantitative arguments, whether given numerically, graphically, or in written form
- manipulate data via the creation and use of relational databases
- become acquainted with basic descriptive statistics and probability
- understand the basic concepts of algorithm creation
- continue the manipulation of discrete data via compression, error detection, and encryption

Course Breakdown:

Module Assignments   75%
     In each module:
- Unit Summary (45 points or 43% per module)
- Projects (60 points or 57% per module)

FINAL Project   25%

An expanded description of each follows:

Module Assignments: Each module lasts ten days. After completing the reading assignments and MP4 lectures for each module, there is a unit summary (5 short answer questions from the reading/lecture materials) and two projects based on the reading/lecture materials. The nature of the projects differ based on the type of material being covered. In addition, there are extra credit opportunities available in each module.

FINAL Project: The final project entails a project which is cumulative for the entire course. It is a project and does not require any proctoring. It is done individually and submitted by the end of the quarter's final's week.

Incomplete and FX Grades

Grades of Incomplete are given only in cases of medical emergency or other highly unusual emergency situations. Please note that University guidelines require that you must be earning a passing grade at the time you request an incomplete grade. You should have completed most of the course, with at most one or two major forms of evaluation missing. Incompletes revert to an F if they are not resolved within one quarter. If such a situation should occur, please inform the instructor as soon as possible. A grade of FX is assigned if the student quits coming to class but never officially drops the course.

Academic Integrity

Violations of academic integrity, particularly plagiarism, are not tolerated. Plagiarism is defined by the university as:

"..a major form of academic dishonesty involving the presentation of the work of another as one's own. Plagiarism includes but is not limited to the following:

a. The direct copying of any source, such as written and verbal material, computer files, audio disks, video programs or musical scores, whether published or unpublished, in whole or part, without proper acknowledgement that it is someone else's.

b. Copying of any source in whole or part with only minor changes in wording or syntax, even with acknowledgement.

c. Submitting as one's own work a report, examination paper, computer file, lab report or other assignment that has been prepared by someone else. This includes research papers purchased from any other person or agency.

d. The paraphrasing of another's work or ideas without proper acknowledgement.

Plagiarism, like other forms of academic dishonesty, is always a serious matter. If an instructor finds that a student has plagiarized, the appropriate penalty is at the instructor's discretion. Actions taken by the instructor do not preclude the college or the university from taking further punitive action including dismissal from the university" (DePaul Student Handbook).

University policies on academic integrity will be strictly adhered to. Consult the DePaul University Student website for further details.

Tentative Weekly Schedule

Mar 24 - Apr 6 (10 days): Database Module 1 Database Design

Apr 4 – Apr 14 (10 days): Database Module 2 Database Implementation

Apr 14 – Apr 24 (10 days): Probability and Statistics Module 1 Useful Statistics

Apr 24 – May 4 (10 days): Probability and Statistics Module 2 Communications

May 4 – May 14 (10 days): Probability and Statistics Module 3 Other Useful Math

May 14 - May 24 (10 days): Computer Science Module 1 Introduction to Computers

May 24 - Jun 5 (10 days): Computer Science Module 2 Important Computer Concepts

Jun 5 - Jun 10 (5 days): Final Projects