

LSP 121 QUANTITATIVE REASONING AND TECHNOLOGICAL LITERACY II

SYLLABUS

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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. In DB MODULE 1, the basic building blocks of relational databases - tables, fields, records and data are covered. Using Microsoft Access, students create a database from scratch, use pre-existing data to populate a database, and using basic search methods to access specific data. There are reading assignments, a presentation and two tutorial videos with corresponding activities. Database Assignment 1 reinforces the concepts learned in this module.
- b. In DB MODULE 2, students cover query operations using Microsoft Access. Students also learn and apply the concept of normalization to database design. There are reading assignments, a presentation and three tutorial videos with related activities. Database Assignment 2 reinforces the concepts learned in this module.
- c. In DB MODULE 3, students learn to implement forms, subforms and reports as well as get a brief introduction to switchboards. There are reading assignments, a presentation and one tutorial video with related activity. Database Assignment 3 reinforces the concepts learned in this module.

2. Probability and Statistics

- a. In PS MODULE 1, students 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. There is a presentation, and four tutorial videos with related activities. Probability and Statistics Assignment 1 reinforces the concepts learned in this module.
- b. In PS MODULE 2, 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. There is a presentation, and four tutorial videos with related activities. Probability and Statistics Assignment 2 reinforces the concepts learned in this module.
- c. In PS MODULE 3, students learn to determine correlations and probabilities using EXCEL. There is a presentation and two tutorial videos with related activities. Probability and Statistics Assignments 3 and 4 reinforce the concepts learned in this module.

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- d. In PS MODULE 4, students learn to calculate and use logs, calculate risks and perform unit conversions. There is a presentation and a tutorial video. Probability and Statistics Assignments 5, 6 and 7 reinforce the concepts learned in this module.
- 3. Algorithms and Programming
 - a. In CS MODULE 1, 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. Computer Programming Assignments 1 and 2 reinforce concepts learned in this module.
 - b. In CS MODULE 2, the student will continue working on programming concepts with more sophisticated code including using variables, messaging, looping and conditionals. There is a presentation and tutorial with related activity. Computer Programming Assignment 3 reinforces the concepts learned in this module.
 - c. In CS MODULE 3, the student will learn about error checking on Data Transmission and data encryption. There are two tutorials for this section. Computer Programming Assignments 4 and 5 reinforce the concepts learned in this module.

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:

Seven of the module assignments require short paragraph responses.

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

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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	30%
Topic Unit Assessments	30%
Quizzes	10%
Final Project-Cumulative	30%

An expanded description of each follows:

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Module Assignments: Each week has between one and three assignments associated with it. They are done individually and submitted to a dropbox by a specific due date.

Topic Unit Assessments: After each topic (Database, Probability and Statistics, and Computer Science), a unit assessment is given. Each assessment is done individually and submitted to a dropbox by a specific due date.

Quizzes: Several of the modules have quizzes related to the material in that module.

Final Project-Cumulative: The final project has a section for each topic. 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

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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

Week 1: Introduction module, DATABASE-the basic building blocks of relational databases - tables, fields, records and data are covered, various methods of populating databases, basic database search methods.

Week 2: DATABASE-Queries and normalization

Week 3: DATABASE- implement forms, sub-forms and reports and a brief introduction to switchboards.

Week 4: PROBABILITY AND STATISTICS: normal distributions, calculating and using the mean, mode, median, range, and standard deviation plus variance, z-scores, percentile and quartile values.

Week 5: PROBABILITY AND STATISTICS: organizing the results of statistical analyses in order to best communicate the results to others, histograms, pivot tables and crosstabs and learn to use EXCEL to generate these.

Week 6: PROBABILITY AND STATISTICS: determine correlations and probabilities using EXCEL.

Week 7: PROBABILITY AND STATISTICS: calculate and use logs, calculate risks and perform unit conversions.

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Week 8: COMPUTER SCIENCE: algorithms and rudimentary computer programming.

Week 9: COMPUTER SCIENCE: continue working on programming concepts with more sophisticated code including using variables, messaging, looping and conditionals.

Week 10: COMPUTER SCIENCE: error checking on Data Transmission and data encryption.