**California State University, San Bernardino**

**College of Education**

# Education Doctorate in Educational Leadership

# EDUC 707 Quantitative Methods Course Syllabus

**(4 units)**

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| Course Title and Number: Quantitative Methods EDUC 707 |
| Instructor: Barry J. Last, Ed.D. |
| **Office: CE-244** |
| **Office Hours: By appointment**  |
| **Office Telephone: (909) 537-5615**  |
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| **Year/Quarter: Winter 2014** |
| **Time/days/location: Tuesday 6:00 PM to 9:50 PM, CE-373** |
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**Wise Reflective Educator Statement**

The College of Education of California State University, San Bernardino (CSUSB) is dedicated to the development and support of wise, reflective professional educators who will work toward a just and diverse society that embraces democratic principles. The wise teacher:

* Possesses rich subject matter knowledge.
* Applies sound judgment to professional practice and conduct.
* Applies a practical knowledge of context.
* Respects multiple viewpoints.
* Reflects and acts on professional practices and their consequences.

(College of Education *Conceptual Framework,* 2006)

**Program Objectives and Student Learning Objectives**

The following list is extracted from the full list of Student Learning Objectives related to the research track. It identifies the alignment of Student Learning Objectives and Student Indicators addressed. Only some of these objectives are directly addressed in this class.

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| **Student Learning Objective:**Designers and users of quantitative and qualifying research to effectuate reform and increase student achievement |
|  | **Student Indicators:**1. Comprehends the relationship and relevance of various theories of knowledge to the study and application of research methodologies in education.
2. Knows the differences between quantitative and qualitative research design and how epistemological perspectives are reflected in those research methodologies.
3. Comprehends how theoretical paradigms and perspectives are reflected in those research methodologies.
4. Recognizes the qualities of an effective research question that expresses a direction for inquiry in precise terms, that is based on a review of the pertinent literature, and that avoids the pitfalls of advocacy.
5. Knows how to interpret a frequency distribution.
6. Knows what contingency tables are and how to test variable relationships.
7. Knows how to apply the concepts of reliability and validity.
8. Knows how to calculate and interpret central tendency, variability, standard normal distributions, and can explain how they relate to basic probability theory.
9. Knows what effect sizes are in evaluation studies and how to calculate them on SPSS.
10. Demonstrates the concept of hypothesis testing, the concepts of Type I and Type II errors, statistical power, *t*-tests, analysis of variance (ANOVA), correlation and regression, and can run these analyses on SPSS or similar statistical software.
11. Knows that all of the above tests may be used for predicting one variable from another.
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**Catalog** **Description**

EDUC 707: Quantitative Methods - Guided practice in designing quantitative research in education. Analyzes quantitative methods, data collection and results.

### Course Goals/Objectives

By the end of the course, students will be able to:

1. Explore and screen data for purposes of basic description and assessment of parametric assumptions.
2. Create data illustrations/graphs appropriate for both descriptive and inferential purposes.
3. Select the appropriate statistical test given the hypothesis and the nature and number of variables involved.
4. Conduct and report the results of inferential tests covered in this class.
5. Use the SPSS statistical software to conduct analyses and produce results specific to objectives 1-4.
6. Derive and report logical conclusions concerning the import of results to theory and practice.

**Purpose and Course Design**

This course will provide guided practice in analytical techniques common to quantitative research in education. We will review basic descriptive statistics and the fundamentals of inferential hypothesis testing. You will then be introduced to each analysis covered in this course and then perform the analysis. Students will then write a report based on their analysis. Students will learn to write results sections that use a balance of significance testing, effect size, precision of estimates, and graphic displays. Students also will write discussion sections that accurately reflect the implications of the results for practice and theory.

The emphasis will be on applications in educational settings, and will make extensive use of hands-on activities using the SPSS program. Each session will begin with a presentation covering a topic from the syllabus, followed by a lab session which provides opportunities for putting the ideas into practice. The presentations and labs will be coupled with opportunities for discussion and questions. Results and discussion sections will be written to report the results obtained in each lab session. These will be due at the beginning of each class the following week. An outline of the content for these reports will be provided and discussed during the first lab assignment session.

In an effort to encourage and develop professional research skills, students will also prepare a research project (similar to a journal article) and in-class presentation (similar to a professional conference). This will build skill in presenting their work to other professionals and disseminating their findings.

## Journal Articles/Textbooks/Bibliography

**Required Textbooks:**

Howell, D.C. (2008). *Fundamental Statistics for the Behavioral Sciences* ***(8th Ed.).*** Belmont, CA: Thomson Wadsworth.

The Howell text will serve as the primary statistical reference for the course.

Mertler, C.A. & Vannatta, R. A. ( 2009). *Advanced and multivariate statistical methods, 4th ed*. Glendale, CA: Pyrczak Publishing.

This text will serve as primary resource for using the Statistical Package in the Social Sciences (SPSS) software.

*Publication Manual of the American Psychological Association (6th Ed.).* Washington, DC: American Psychological Association.

This will be an invaluable manual throughout your involvement in the Ed.D. program. All papers, research works, etc., for this course, and all Ed.D. courses at CSUSB must be formatted in *APA Style*.

**Required Readings:**

Required articles/readings are available in electronic format (PDF) via the persistent web links available on BlackBoard.

The articles/readings are outlined in the course schedule.

To access articles in PDF. Persistent links to the PDF version of the articles housed at the CSUSB Library will be provided via BlackBoard. You will first have to log into BlackBoard, access course materials for EDUC 707, follow the link to the appropriate article. If you are on campus, the link will take you directly to the CSUSB Library. You will not have to log into the library. If you are off-campus, you will need to log into the CSUSB Library for access to the article. Please Note: In many cases, the persistent link provided will bring you to the abstract page for the article, you will still need to open the PDF link in order to read (save, or print) the complete article.

Online IRB Training

Since you have completed the CITI Training in EDUC 700, you write a summary as a springboard for a discussion on completing the Objective portion of the IRB document. Be sure to read the IRB document that is online through the CSUSB website.

**Statistics Power Points:**

Each week you will have the opportunity to view Power Points related to the statistical principles presented. I will also present a tutorial on how to use the SPSS data analysis to assist your with your projects.

**Supplemental Reading:**

As indicated in the course schedule, there are supplemental readings which may assist you in preparing your course assignments as they will provide a template for part of your assignment; however, these readings are not required but are presented for information purposes. The references have been provided in the course schedule. The articles are available electronically via the CSUSB Library; it is your responsibility to access these articles if interested.

**Data Sets**

Students are to find and use a meaningful data set(s) for use throughout the course. Consult with academic advisors, research supervisors, mentors, on-line data bases, etc., for potential data sets to use in this course. It is the student’s responsibility to demonstrate approval for use of the data set in this course. Students may choose to use more than one approved data set during the course in order to ensure the selected data set(s) meets the variable requirements for each analysis. **The selected data set(s) MUST be approved by the instructor**. Approved data sets will be in electronic format, SPSS compatible, include variables and levels of measurement (e.g., categorical, continuous, groups) consistent with the analyses to be covered in the course, and will contain NO participant identifying information. **Potential data sets MUST be approved by the instructor no later than the in-class lab during Week 2 (Jan 14, 2014)** as they will be needed for the in-class lab session at that time**. The approved data set(s) MUST be brought to all class sessions starting Week 2 (Jan 14, 2014) to be used for the In-class Labs and Report Assignments.**

## Course Evaluation Plan

All student work must demonstrate academic and research rigor of doctoral-level quality.

**In-class Labs** and **Report Assignments.** Each in-class lab will present a problem for you to tackle. Students will use their data set(s). “Computing” will be done during the in-class lab period and the instructor and graduate assistant will provide instruction and guidance. Results then will be used to complete an *abbreviated* REPORT ASSIGNMENT which will include an introduction, hypothesis, description of variables used, a results section and discussion section. Each REPORT ASSIGNMENT will be due by the beginning of class the following week. Reports are to be submitted electronically (via Black Board using the Digital Drop Box) in **.doc** extension format and pertinent SPSS printouts of results are to be attached or appended to the REPORT ASSIGNMENT. File names should include last name, first initial, and assignment name (example: MahoneyMDisplayingData). Blackboard will NOT download file names which contain special characters (that is use alphanumerical characters only). Each REPORT ASSIGNMENT will be worth 100 points to be graded by the instructor. Grading will be assigned using the following benchmarks: 100 = excellent, 90 = good, 80 = adequate. There will be a total of **FIVE (5) REPORT ASSIGNMENTS** due over the course.

Late REPORT ASSIGNMENTS will be penalized 10 points for each day the assignment is late. REPORT ASSIGNMENTS turned in after class will be marked late. Prepare your assignment well before it is due to ensure potential problems (e.g., computer, internet, printer, family, health problems, etc.) do not interfere with your ability to submit your assignment on time.

**Individual Research Project** and **In-class Presentation.** While the in-class lab and Report Assignments will focus on statistical analysis and writing of the findings, remember research is a more comprehensive endeavor. Skills learned in the previous methods course (EDUC 700) will be applied to produce a more complete research document. Students will develop a working hypothesis to be tested using the variables within their selected data set. A journal article-length RESEARCH PROJECT will be produced, starting with a literature-based justification of the hypothesis, a brief description of the methodology, the results, and the final discussion. The statistical analysis should be Multiple Regression, ANCOVA, or factorial ANOVA. Lab time will be made available and the instructor and graduate assistant will provide support during these times. The RESEARCH PROJECT is NOT to be a replication of any of the Research Assignments; that is, the RESEARCH PROJECT must be new and unique. The RESEARCH PROJECT will be due at the beginning of the last course session. The RESEARCH PROJECT will be submitted electronically (via Black Board) as an attachment in .doc extension format. File names should include last name, first initial, and assignment name (example: LastBFinalResearchProject). Blackboard will NOT download file names which contain special characters (that is use alphanumerical characters only). During the last course session, students will present their Research Report to the class. Students will prepare a 10 minute presentation to present their Research Report with an additional 5 minutes for Questions & Answers (total 15 minutes). Presentations may be in Poster Format, PowerPoint or another media consistent with presenting research findings at a professional conference. The RESEARCH PROJECT and the RESEARCH PROJECT PRESENTATION will each be worth 100 points to be graded by the instructor. Grading will be assigned using the following benchmarks: 100 = excellent, 90 = good, 80 = adequate.

Late RESEARCH PROJECTS will be penalized 10 points for each day the assignment is late.

**Class Attendance & Participation**

Students should take class attendance & participation seriously, as it accounts for 5% of the final course grade. Full credit for attendance will be given for students who attend each class session, are on time and remain for the whole class. If you need to miss a class session or need to leave a class session early, please inform the instructor prior to the absence. If you miss a class session, please make arrangements to get notes from a classmate.

Class participation grades will be assigned for quality of participation in class discussions including contribution to the flow of scholarly, graduate-level inquiry and not based on quantity. Students who excel in class participation stay abreast of the readings, engage in content-oriented dialogue, come to class prepared to participate, and turn assignments in on time. Given the nature of the class and the assignments, expect to spend at least 8 to 12 hours a week outside of the class working on the materials.

In consideration of others, all cell phones, pagers, electronic devices, etc., should be turned off or put on mute/vibrate. Use of cell phones, pagers, etc., is not permitted during class session. Although we are in a computer lab, students should be attentive to the class lecture, discussion and demonstrations and not spend time accessing the internet, checking email, etc., unless it is required for the class. Inappropriate use of electronic devices, the internet, etc., will result in a reduction in the grade assigned for Class Attendance and Participation.

There will be **two in-class midterm exams**, which will be 120 minutes in duration and cover all course material up to the date of the exam.

Your final grade will be determined based on the following weightings:

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| --- | --- |
| Labs/Assignments | 25 |
| Research Project | 20 |
| In-class Research Presentation | 20 |
| Midterm Exam #1 | 15 |
| Midterm Exam # 2 | 15 |
| Attendance & Participation | 5 |

The grading scale for the final grade will be:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 93+ | A | 80-82 | B- | 66-69 | D+ |
| 90-92 | A- | 77-79 | C+ | 63-65 | D |
| 87-89 | B+ | 73-76 | C | 60-62 | D- |
| 83-86 | B | 70-72 | C- | < 60 | F |

*If you are on financial aid: Please be aware that receiving grades of F, I, NC, and WU may have an impact on your financial aid. It is a student’s responsibility to maintain financial aid eligibility*.

As doctoral candidates you are expected to:

1. To attend all class meetings on time and to remain for the duration of the class time. If you are unable to attend a class meeting, it is your responsibility to notify the instructor (preferably in advance of the class meeting time). If you miss a class meeting, it is your responsibility for making up the missed class work and to borrow notes from a classmate. If you have questions regarding a missed class session after reading the assigned materials and reviewing the notes from a classmate, please contact the instructor.
2. To read all assigned readings before each class meeting.
3. To turn in all assignments on time. A late penalty of 10% per day will be assessed on all assignments submitted after their due date.
4. To fully and appropriately participate in class discussions.

All written work is expected to meet standards of academic and professional excellence. All written submissions and oral presentations must be of scholarly, doctorate-level quality. Assignments will be typed. You will lose points for work with excessive errors.

Strict adherence to the *APA Publication Manual (6th edition)* is required. APA is the ONLY accepted manuscript style and reference citation in this course.

Candidates are urged to proof their material before submission, and to solicit editing assistance from a friend or colleague. Follow APA guidelines for page numbering, quotations and citations, references, punctuation, voice, etc.

***Portfolios***

Candidates are reminded to select required and optional artifacts from this course for submission to their Portfolio. Each Portfolio will contain the following elements:

1. Statement of Purpose in the Ed.D. program.

1. Current (updated) resume.
2. Examples of coursework reflecting the Student Learning Outcomes and core concepts (e.g., papers submitted, tests completed, projects completed, etc.) with a Reflection and Analysis Reaction Paper of how each element submitted is relevant to their dissertation topic, research activities, and demonstrates professional growth and understanding.
3. Summary of research and dissertation activities. Students should submit a summary (no longer than one page for each element submitted) of work they have completed on their dissertation. Organization of this section of the portfolio should align with the dissertation chapters: a) Research Question; b) Literature Review; c) Methodology; d) Results; and, e) Conclusions. The portfolio, over its development, should provide longitudinal evidence of activities related to completion of the dissertation. Additionally, students may also submit a summary regarding any research activities that may be in addition to their dissertation.

Additionally, students may include optional elements, such as, but not limited to:

5. Conference participation and/or presentations

6. Manuscript/publication drafts

7. Additional noteworthy course work/projects

8. Professional work samples

**Reflection and Analysis – this will be completed for each element from #3 through #8 (both required and optional) included in the portfolio.**

Portfolios are to be submitted each summer quarter for evaluation. It is the candidate’s responsibility to ensure they are creating and maintaining their Portfolio throughout the year.

**Course Requirements & Course Calendar**

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| Week | Date | Topic | Readings | Assignments Due |
| 1 | Jan 7 | Introduction, Basic Review, Displaying Data, Measures of Central Tendency, Descriptive Statistics, Introduction to SPSS | From the textbooks:Introduction (Howell, Ch. 1)Basic Concepts (Howell, Ch. 2) Displaying Data (Howell, Ch. 3) Measures of Central Tendency (Howell, Ch. 4) Measures of Variability (Howell, Ch. 5)Introduction to Multivariate Statistics (Mertler & Vannatta, Ch. 1)A Guide to Multivariate Techniques (Mertler & Vannatta, Ch. 2)Articles (on BlackBoard):Smith, L.D., Best, L.A., Stubbs, A., Archibald, A. B., & Roberson-Nay, R. (2002). The role of graphs and tables in hard and soft psychology. *American Psychologist, 57*, 749-761. <http://libproxy.lib.csusb.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=amp-57-10-749&site=ehost-live>Discussion of IRB Document |  |
| 2 |  Jan 14 | Distributions,Parametric Assumptions, Probability, Sampling, Hypothesis Testing | From the textbooks:The Normal Distribution (Howell, Ch. 6) Basic Concepts of Probability (Howell, Ch. 7)Sampling Distributions & Hypothesis (Howell, Ch. 8)Articles (on Blackboard):Cohen, J. (1994). The earth is round (*p* < .05). *American Psychologist, 49,* 997-1003. <http://libproxy.lib.csusb.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=amp-49-12-997&site=ehost-live>  | **Approval of data set(s) by this date**.**Summary of the CITI Training Due** |
| 3 | Jan 21 |  Data Screening, Power, Effect Size | From the textbooks:Pre-analysis Data Screening (Mertler & Vannatta, Ch. 3)Power (Howell, Ch. 15) Articles (on BlackBoard):Cohen, J. (1992). A power primer. *Psychological Bulletin, 112,* 155-159. <http://libproxy.lib.csusb.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=bul-112-1-155&site=ehost-live> Aguinis, H., Beaty, J.C., Boik, R. J., & Pierce, C. A. (2005). Effect size and power in assessing moderating effects of categorical variables using multiple regression: A 30-year review. J*ournal of Applied Psychology, 90*, 94-107. <http://libproxy.lib.csusb.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=apl-90-1-94&site=ehost-live> Faust D., & Meehl, P. (2002). Using meta-scientific studies to clarify or resolve questions in the philosophy and history of science. *Philosophy of Science, 69*, S185-S196. <http://libproxy.lib.csusb.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=17232641&site=ehost-live> | Report Assignment #1: Distributions & Descriptives |
| 4 | Jan 28 | Midterm Exam # 1 |  REVIEW | In-class Midterm Exam # 1 |
| 5 | Feb 4 | *t*-tests | From the textbooks:Hypothesis Testing Applied to Means: One Sample (Howell, Ch. 12)Hypothesis Testing Applied to Means: Two Related Samples (Howell, Ch. 13)Hypothesis Testing Applied to Means: Two Independent Samples (Howell, Ch. 14)For an example of how to write a results and discussion sections for *t*-tests:Mayer, R. E., Stull, A. T., Campbell, J., Almeroth, K., Bimber, B., Chun, D., & Knight, A. (2007). Overestimation bias in self-reported SAT scores. *Educational Psychology Review, 19*, 443-454.  | Report Assignment #2: Data Screening |
| 6 | Feb 11 | Correlation, Regression, Multiple Regression | From the textbooks:Correlation (Howell, Ch. 9)Regression (Howell, Ch. 10)From the textbooks:Regression (Howell, Ch. 10)Multiple Regression (Howell, Ch. 11)Multiple Regression (Mertler & Vannatta, Ch. 7)For an example of how to write a results and discussion sections for regression and multiple regression:Jacoby, D. (2006). Effects of part-time faculty employment on community college graduation rates. *Journal of Higher Education, 77*, 1081-1103.  | Report Assignment #3: *t*-tests & Correlation |
| 7 | Feb 18 | ANOVA, ANCOVA  | From the textbooks:One-way Analysis of Variance (Howell, Ch. 16)Factorial Analysis of Variance (Mertler & Vannatta, Ch. 4, pp. 67 - 70)Analysis of Covariance (Mertler & Vannatta, Ch. 5)For an example of how to write a results and discussion sections for ANOVA:Ray, D. C. (2007). Two counseling interventions to reduce teacher-child relationship stress. *Professional School Counseling, 10*, 428-440. Okpala, C. O., Bell, G. C., & Tuprah, K. (2007). A comparative study of student achievement in traditional schools and schools of choice in North Carolina. *Urban Education, 42*, 313-325.  | Report Assignment #4: Multiple Regression |
| 8 | Feb 25 | Midterm Exam # 2 |  REVIEW | In-class Midterm Exam # 2 |
| 9 | March 4 | Factorial ANOVA | From the textbooks:Factorial Analysis of Variance (Howell, Ch. 17)Factorial Analysis of Variance (Mertler & Vannatta, Ch. 4)For an example of how to write a results and discussion sections for Factorial ANOVA:Landrum, T. J., Cook, B. G., Tankersley, M., & Fitzgerald, S. (2007). Teacher perceptions of the useability of intervention information from personal versus data-based sources. Education and Treatment of Children, 30, 27-42.  |  |
| 10 | March 11 | Non-parametric tests, Flex Week | From the textbooks:Chi-square (Howell, Ch. 19)Nonparametric and Distribution-free Statistical Tests (Howell, Ch. 20)For an example of how to write a results and discussion sections for non-parametric tests1`):Maxell, J. C., Tackett-Gibson, M., & Dyer, J. (2006). Substance use in urban and rural Texas school districts. *Drugs: Education, Prevention and Policy, 13*, 327-339.  | Report Assignment #5:ANOVA, ANCOVA, Factorial ANOVA |
|  |  | Project Presentations | In class presentation of final project\*These presentations will be scheduled on the prior two weeks of the course. | Individual Research ProjectIn-class Presentation of Research Project |

## Course Policies

***Academic Honesty:*** “Plagiarism and cheating are violations of the Student Discipline Code and may be dealt with by both the instructor and the Judicial Affairs Officer. Plagiarism is the presentation of one’s own, the ideas and writing of another. Plagiarism is academically dishonest and subjects the offending student to penalties up to and including expulsion. Students must make appropriate acknowledgements of the original source where material written or compiled by another is used” (*CSUSB Bulletin*, 2001-2002, p. 57). In accordance with university policy, instances of plagiarism and/or cheating in this course will result in a reduction of the final grade and may result in a failing grade for the course.

Refer to the General Regulations and Procedures in the CSUSB Bulletin of Courses for the university’s policies on academic honesty, cheating, and course withdrawal.

If a student decides to withdraw from this course, it is the student’s responsibility to do so in accordance with university policies and, if necessary, to notify student financial aid as withdrawal may influence the amount of funds available to the student.

## Commitment to Diversity

In our commitment to the furthering of knowledge and fulfilling our educational mission, California State University, San Bernardino seeks a campus climate that welcomes, celebrates, and promotes respect for the entire variety of human experience. In our commitment to diversity, we welcome people from all backgrounds and we seek to include knowledge and values from many cultures in the curriculum and extra-curricular life of the campus community. Dimensions of diversity shall include, but are not limited to, the following: race, ethnicity, religious belief, sexual orientation, sex/gender, disability, socioeconomic status, cultural orientation, national origin, and age. (from the CSU San Bernardino University Diversity Committee Statement of Commitment to Diversity, 1995)

In keeping with the university’s Commitment to Diversity, the faculty of the College of Education fully support the Americans with Disabilities Act (ADA). Faculty will provide reasonable accommodation to any student with a disability who is registered with the Office of Services to Students with Disabilities and who needs and requests accommodation. If you are in need of an accommodation for a disability in order to participate in this class, please let me know ASAP and also contact Services to Students with Disabilities at UH-183, (909)537-5238.