Advanced Educational Research and Statistics CEST 9300

New Orleans Baptist Theological Seminary
Christian Education Division

Rick Yount
Visiting Professor of Christian Education
RYount@nobts.edu   Office: (504) 282-4455
WYount@aol.com   Cell: (817) 938-1303
NOBTS Web page: http://nobts.edu/Faculty/StoZ/YountR

The mission of New Orleans Baptist Theological Seminary is to equip leaders to fulfill the Great Commission and the Great Commandments through the local church.

Purpose of the Course

The purpose of this course is to engage students with the biblical mandate to "measure honestly" through the application of established processes of research design and statistical analysis to the educational ministries of local churches and the denomination.

Core Value Focus

Doctrinal Integrity – Knowing that the Bible is the Word of God, we believe it, teach it, proclaim it, and submit to it. The doctrinal statements used in our evaluations are our Articles of Religious Belief and the Baptist Faith and Message Statement.

Spiritual Vitality – We are a worshiping community, with both personal spirituality and gathering together as a Seminary for the praise and adoration of God and instruction in His Word.

Mission Focus – We are not here merely to get an education or to give one. We are here to change the world by fulfilling the Great Commission and the Great Commandments through the local church and its ministries.

Characteristic Excellence – What we do, we do to the utmost of our abilities and resources as a testimony to the glory of our Lord and Savior Jesus Christ.

Servant Leadership – We follow the model of Jesus and exert leadership and influence through the nurture and encouragement of those around us. Annually, the President designates a core value as the focus of learning for the academic year. The core value for academic year **2016-2017** is Characteristic Excellence**.**

Curriculum Competencies Addressed

This course will address the following curriculum competencies:

1. ***Servant Leadership****:* To serve churches effectively through team ministry. *Educational research and statistics undergirds this competency by providing tools for honest measurement and problem-solving in educational ministries.*

2. ***Spiritual and Character Formation****:* To provide moral leadership by modeling and mentoring Christian character and devotion. *The discipline and self-motivation required to master the technical languages of research and statistics provides opportunities for spiritual growth.*

3. ***Disciple Making****:* To stimulate church health through mobilizing the church for missions, evangelism, discipleship, and church growth. *Educational research and statistics provides the tools for honest, real-world evaluation of educational programs and procedures.*

Course Rationale

Judgments based on emotions and personal biases, the norm in our contemporary Post-modern society, are forbidden by the Lord, Who calls us to deal honestly and accurately with each other in our work.

Use honest scales and honest weights, an honest ephah and an honest hin.
I am the LORD your God, who brought you out of Egypt.
(Lev. 19:36, NIV)

The LORD abhors dishonest scales, but accurate weights are his delight.
(Prov. 11:1, NIV)

Post-modern thought rejects objective truth in favor of personal, subjective, relativistic emotion. Post-modernism emphasizes personal emotional responses over objective rational responses, because "true understanding is not possible." Political thought rejects honesty in favor of power. Whatever amasses more power to the leader is "true." All else is "false." Ideology preaches its "truths" and demands alignment to it. Honest science ignores subjective emotions and political ideology and embraces the collection and analysis of credible real-world data. "Let the data speak."

While the dominant scientific perspective of Modernist society (20th century) was no friend to the Church or to biblical faith, at least it attempted to be objective in its pursuit of "truth that exists in the world." Even in our society, where feelings outweigh facts, an objective, unbiased collection of data, and a precise, objective analysis of that data, provides answers that are more stable than feelings. It is far more accurate than politicized propaganda.

We do well to heed the Lord's command to evaluate what we do by means that are valid, reliable, and objective. Research design and statistical analysis gives us those tools.

Course Description

Educational Research (design) and Statistics (analysis) are the advanced languages of Christian education, including educational psychology (learning, development, and motivation), teaching the Bible, discipleship, small-groups, age-group dynamics, and administration & leadership.

This course provides you the tools for advanced studies in these fields.
First, the course provides you the language tools – vocabulary and concepts – for understanding research in your field. You will be a better consumer of research information in the world.
Further, it provides you the skills to design your own study, collect valid data, and analyze that data to provide answers to great questions that confront contemporary educational ministries.
Finally, this course prepares you for analyzing empirical research in Ed.D and Ph.D. seminars, as well as the preparation and execution of a formal doctoral research proposal.

Course Learning Objectives

1. Learners will demonstrate their understanding of **biblical concepts of measurement** by doing such things as

. . . exegeting prescribed passages calling for "fair weights and measures."
. . . explaining how biblical concepts of measurement are engaged through honest research design and objective data analysis

2. Learners will demonstrate understanding of statistical analysis by doing such things as
   . . . correctly using Intellectus Statistics to analyze assigned problems
   . . . choosing the appropriate statistic for their research proposal

3. Learners will demonstrate general understanding of the terminology, principles, and fundamental concepts of educational research and statistics by passing course quizzes and the course final exam.

4. Learners will demonstrate understanding of the elements of research design by developing a basic research proposal according to guidelines emphasized in the text and course lectures.

Course Text

Required Text
Yount, William R. *Research Design and Statistical Analysis in Christian Ministry*, 5th ed. Fort Worth: Self-Published, 2015. The various editions of this text were used in Masters' and Doctoral studies at Southwestern Seminary, School of Educational Ministries, from 1987-2012. It has been revised for use in this seminar. It is available as a free download from the author.

Intellectus Statistics

The computer program *Intellectus Statistics* has been adopted for use in 6300 and 9300 courses. You will find IS much easier to use that SPSS, and less expensive to license.

While IS increases user-friendliness at the cost of user choices, IS delivers the most significant advantage for students in the form of an explanatory narrative of analysis findings. While you still need to understand the vocabulary, IS provides you a solid basis of explanation of findings, including charts and tables.

One month before the June 19 seminar start date, access to IS will be made available to all registered students. I will send IS a class roll with email addresses, and they will send you instructions in how to log on to their website. You can begin as soon as you read this to try out IS for free at
http://www.intellectusstatistics.com/intellectus-free/

Course Teaching Methodology

This course utilizes pre-course reading/response, lecture, small-group exercises, and the development of a post-course research proposal. The course is taught in a one-week intensive format.

Assignments

Pre-Workshop Preparation
CEST 9300 builds on CEST 6300 *Educational Research and Statistics* and assumes you have completed that course. You will take a comprehensive exam over the course text (similar to the final exam from CEST 6300) on Monday morning, June 19. Your pre-Workshop preparation is using stated objectives in this syllabus to prepare for this exam. No written work is required.

We will also be using Intellectus Statistics during this course, so you will need access to the program. Details will be sent to you.

Preliminary Exam
The Preliminary Exam is based on Chapters 1-26 of the course text. Chapters 25 and 26 are extra credit, just as the final exam in 6300. This is a closed book, closed note test.

The Problem
Write an appropriate Problem Statement for your proposed dissertation topic.

The Hypothesis
Write an appropriate Research Hypothesis and its Null counterpart for your stated Problem.

The Statistic
State the statistical procedure you will use to test the Null Hypothesis. Explain what this statistic provides as output. How will you determine "significance"?

The Mini-Proposal
Combine the following components into a single proposal, which you will submit at 1:00 pm Thursday for evaluation by the class. Introductory statement, Problem, Purposes, Population, Sampling and Sample(s), Research Hypothesis, Null Hypothesis, Statistic, Testing the Hypothesis.

Final Exam
The Final Comprehensive examination targets all instructional objectives listed below. Double points on the Final Exam allows you to improve your understanding over the week, based on your performance on the Preliminary Exam. While the double points help you to improve your grade in the course, it also can hurt your grade if you fail to overcome weaknesses in understanding of research design and statistical analysis.

Post-Workshop Assignment
Following the evaluation of the mini-proposal, develop a revised research proposal that includes the additional elements of Introductory Statement, Procedure for Collecting Data, and Procedure for Analyzing Data. Due one month after course ends.

Learning Activities and Assessments

Assignments		Session	Points
Preliminary Exam	(ch 1-26)	Monday	100
Problem		Tuesday	20
Hypothesis		Wednesday	20
Statistic		Thursday	20
Mini-Proposal		Thursday	40
Final Exam	(ch 1-26)	Thursday	200
Proposal		July 21	100
			500

Grade Scale		
A	93-100	465-500
B	85-92	425-464
C	77-84	385-424
F	00-76	000-384

Examination Objectives

General Objective for all examinations
Learners will demonstrate understanding of basic research vocabulary in chapter summaries by correctly interpreting terms in test items.

The following objectives are organized by "6300 Quizzes," but are all included in the two comprehensive exams.

Quiz One
Learners will demonstrate understanding of science and faith (ch 1) by doing such things as...
>. . . defining in their own words the six ways of knowing, and giving an original example of each.
>. . . explaining any of the five ideals of science
>. . . placing steps of the Scientific Method in proper sequence
>. . . matching research examples with their research type

Learners will demonstrate understanding of the research proposal (ch 2) by doing such things as...
>. . . distinguishing between a summary of literature and a synthesis of literature
>. . . distinguishing between a limitation and a delimitation
>. . . distinguishing between the Introduction and the introductory statement
>. . . matching proposal elements with the major section (introduction, method, analysis) to which they belong

Learners will demonstrate understanding of empirical measurement (ch 3) by doing such things as...
>. . . matching data examples with their data type
>. . . distinguishing between constants and variables
>. . . distinguishing between dependent and independent variables
>. . . distinguishing between good and bad operational definitions

Learners will demonstrate understanding of Problem and Hypothesis statements (ch 4) by doing such things as...
>. . . distinguishing between statements of "relationship" and "difference"
>. . . distinguishing between good and bad problem and hypothesis statements
>. . . differentiating between directional, non-directional, research, and null (statistical) hypotheses
>. . . explaining the four characteristics of a good problem statement
>. . . writing specified Problem and Hypothesis statements, given variables

Learners will demonstrate understanding of the statistical flowchart (ch 5) by analyzing research scenarios and determining which statistic should be used.
>Statistical tests will be limited to Pearson's r, Spearman rho, phi coefficient, Chi-Square Goodness of Fit, Chi-Square Test of Independence, one-sample z-test, one-sample t-test, independent samples t-test, matched samples t-test, ANOVA, Mann-Whitney U test, linear regression and multiple regression.

Learners will demonstrate understanding of the Synthesis of Related Literature (ch 6) by doing such things as...
>. . . differentiating between preliminary, primary and secondary sources of information
>. . . explaining the meaning of ERIC, SSIE, RIE, CIJE, SCI, and SSCI
>. . . differentiating between Boolean operators "AND" and "OR"

Quiz Two

Learners will demonstrate understanding of inferential statistics by distinguishing this branch from descriptive statistics (ch 7).

Learners will demonstrate understanding of population sampling (ch 7) by doing such things as...
> . . . explaining the purpose of sampling in research
> . . . differentiating among four types of sampling
> . . . calculating proper sample size based on Curry's rule of thumb
> . . . differentiating among target population, accessible population, and sample.

Learners will demonstrate understanding of effective measurement (ch 8) by such things as. . .
> . . . differentiating among four kinds of validity, three kinds of reliability, and objectivity
> . . . matching reliability tests (split-half, coefficient α, test-retest, and parallel forms) to reliability type
> . . . interpreting examples or reliability and validity based on Babbie's "shots on a target"

Learners will demonstrate understanding of observation (ch 9) by doing such things as...
> . . . describing three obstacles to objectivity in observation
> . . . differentiating between interference and inference in observation

Learners will demonstrate understanding of survey research (ch 10) by doing such things as...
> . . . explaining advantages and disadvantages of the questionnaire
> . . . explaining advantages and disadvantages of the interview
> . . . computing rate of return for mailed questionnaires
> . . . differentiating the use of demographic questions in survey and interview

Learners will demonstrate understanding of writing test items (ch 11) by doing such things as...
> . . . defining five guidelines for writing tests
> . . . explaining why objective tests produce more reliable scores than essay tests
> . . . analyzing test items according to principles for writing test items

Learners will demonstrate understanding of developing attitude scales (ch 12) by differentiating among Likert, Thurstone, Q-Sort, and Semantic Differential scale types

Learners will demonstrate understanding of experimental design (ch 13) by such things as. . .
> . . . identifying research design examples.
>> Examples will be limited to Pretest-Posttest Control Group Design, Posttest-Only Control Group Design, Solomon Four-Group, Time Series, Non-equivalent Control Group Design, and the One Group Pretest/Posttest.
>
> . . . differentiating between pre-experimental, true experimental and quasi-experimental designs.

Quiz Three

Learners will demonstrate understanding of basic mathematical symbols and operations (ch 14) by correctly interpreting mathematical examples.

Learners will demonstrate understanding of graphing conventions (ch 15) by such things as . . .
> . . . differentiating between grouped and ungrouped frequency distributions

. . . defining range, class width, and class limits in her own words
. . . differentiating between a histogram and a frequency polygon
. . . describing three kinds of kurtosis and two kinds of skew

Learners will demonstrate understanding of central tendency, variability and z-scores (ch 16) by doing such things as . . .
. . . defining three measures of central tendency
. . . differentiate between average and standard deviation
. . . differentiate among population parameters, sample statistics and estimated parameters
. . . computing mean, sum of squares, variance and standard deviation from a set of scores
. . . computing a z-score from a given score, mean and standard deviation

Learners will demonstrate understanding of the Normal Curve and hypothesis testing (ch 17) by doing such things as. . .
. . . defining the major characteristics of the standard Normal Curve
. . . differentiating between one-tail and two-tail statistical tests
. . . differentiating between frequency and sampling distributions
. . . differentiating between standard deviation and the standard error of the mean

Learners will demonstrate understanding of the Normal Curve and error rates (ch 18) by doing such things as . . .
. . . defining type I error, type II error, and power in statistical testing
. . . explaining the relationship between the 2x2 decision table and areas under normal curves
. . . explaining three ways to increase power in statistical power

Learners will demonstrate understanding of 1-sample and 2-sample parametric tests (z, t) by explaining the elements and procedures, including degrees of freedom, in computing the 1-sample z-, the 1-sample t-, independent samples t- and matched samples t-tests. (chs 19-20)

Quiz Four
Learners will demonstrate understanding of Analysis of Variance (ch 21) by doing such things as...
. . . explaining the partitioning of total sum of squares into between and within sums of squares
. . . computing an F-ratio by using a partially completed ANOVA table
. . . determining significance of F-ratio values, given the appropriate critical value
. . . determining significance of F-ratio values, given p and
. . . comparing and contrasting multiple comparison procedures (LSD, FLSD, SNK, HSD, Scheffe)

Learners will demonstrate understanding of correlation (ch 22) by doing such things as…
. . . matching research scenarios with appropriate correlational procedures.
. . . explaining the problem of significance testing with correlational coefficients
. . . explaining the meaning and use of the coefficient of determination

Learners will demonstrate understanding of Chi-Square procedures (ch 23) by such things as . . .
. . . differentiating between EE, PE and TI designs for computing expected frequencies
. . . analyzing approaches to computing the three chi-square tests
. . . determining significance of chi-square values, given the appropriate critical values
. . . explaining four cautions in using the Chi-Square statistic

Learners will demonstrate understanding of the Ordinal Tests (ch 24) by doing such things as . . .
. . . explaining the meaning and use of "sum of ranks"

. . . matching ordinal tests to parametric counterparts.

Learners will demonstrate understanding of factorial statistics (ch 25) doing such things as . . .
    . . . explaining the meaning and use of n-way ANOVA, ANCOVA, and MANOVA
    . . . explaining the meaning of interaction, and its impact on results interpretation

Learners will demonstrate understanding of regression statistics (ch 26) by doing such things as . . .
    . . . explaining the meaning of regression
    . . . differentiating between linear and multiple regression
    . . . correctly reading regression print-outs to determine proportion of variance accounted for
        (R^2), the significance of predictors, and the significance of the full regression model.

Seminary-Wide Course Policies

Late Assignments
Assignments not submitted on the due dates are considered late and will be automatically penalized 10% for each date late including weekends. Late assignments will not be accepted one week beyond the original due date, no exceptions. No grades of Incomplete will be issued for this course. If a late assignment is not received, a grade of "F" is automatically earned for the course.

Grading Scale
Your final grade will be based on your total accumulation of points as indicated under the Learning Activities and Assessments section of this syllabus according to the grading scale in the NOBTS 2011-2012 catalog.

A: 93-100   B: 85-92   C: 77-84   D: 70-76   F: 69 and below

Netiquette
Appropriate Online Behavior. Each student is expected to demonstrate appropriate Christian behavior when working online in discussion board dialogues or whenever interaction occurs through the web, digital, or other electronic medium. The student is expected to interact with other students in a fashion that will promote learning and respect for the opinions of others in the course. A spirit of Christian charity is expected at all times in the online environment.

Selected Reference Bibliography

Gall, M. D., Joyce P. Gall, Walter R. Borg. *Educational Research: An Introduction*, 8th ed. Pearson. 2006

Creswell, John W. *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research*, 4th ed. Pearson. 2011

Gravetter, Frederick J and Larry B. Wallnau. *Essentials of Statistics for the Behavioral Sciences,* 8th ed. Wadsworth Cengage Learning. 2013

Classic Texts

Ary, Donald, Lucy Chesar Jacobs and Asghar Razavieh. *Introduction to Research in Education*. New York: Holt, Rinehart, and Winston, 1972.

Babbie, Earl. *The Practice of Social Research*, 3rd ed. Belmont, CA: Wadsworth Publishing Company,

1983.

Drew, Clifford J. and Michael L. Hardman. *Designing and Conducting Behavioral Research*. New York: Pergamon Press, 1985.

Glass, Gene V. *Statistical Methods in Education and Psychology*, 2nd. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1984.

Hinkle, Dennis E., William Wiersma, and Stephen G. Jurs. *Basic Behavioral Statistics*. Boston: Houghton Mifflin Company, 1982.

Kubiszyn, Tom and Gary Borich, *Educational Testing and Measurement: Classroom Application and Practice*, 2nd. Glenview, IL: Scott, Foresman and Company, 1987

Mueller, Daniel J. *Measuring Social Attitudes: A Handbook for Researchers and Practitioners*. New York: Teachers College Press, 1986.

Sax, Gilbert. *Foundations of Educational Research*. Englewood Cliffs, N. J.: Prentice-Hall, 1979.