



School of Educational Ministries
 Southwestern Baptist Theological Seminary
 William R. "Rick" Yount
RYount@swbts.edu

Research and Statistics For Advanced Studies

FOUND 4383 – Spring 2006

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)

Course Description

In this course you will learn essential principles of research design and statistical analysis. Mastery of these essential will make you a better consumer of scientific research in your field, and enable you to develop and conduct studies of your own.

Grading

Elements	Points	Session	Course Grade
Exam 1 Research Design	100	12	A 305-450 90%
Exam 2 Statistical Methods	100	24	B 260-304 80
A1 Problem, Hypothesis, Stat	30	07	C 215-259 70
A2 Initial Literature	40	11	D 170-214 60
A3 Research Proposal	60	26	F 000-169
A4 Two Evaluations	20	28	Plus/minus grades by seminary policy
Worksheets 1-12 (5 pts @)	50**	As assigned	
Final Comprehensive	<u>100</u>	Final Exam Day	
	500		

**Twelve worksheets provide opportunities to practice course concepts.
 Answer sheets will posted on Blackboard after due date. Two extra worksheets provide 10 points extra credit.

Course Information

Blackboard Resources

I have set up a Blackboard site for our course. You will find course resources at this site. Go to the seminary web site (<http://www.swbts.edu>) and click on "Blackboard (on-line courses)." Log into Blackboard with your ID and password. If you do not have these, follow the instructions under "log in!" Once inside Blackboard, you should see our course **06_SP_FOUND4383A**. Click on this course and you will be able to access class resources. For example, a session-by-session overview can be found under "**Course Information**." Announcements display as you enter the course. Areas to post questions to the professor, prayer requests and praises, and specific questions about chapters can be found under "**Discussion Boards**."

Research Design and Statistical Analysis for Christian Ministry 4th ed. was written specifically for this course. The structure of the text, study questions, sample test questions, and the use of bold face type focus your studies on key concepts. Study new vocabulary as you would a foreign language. Use the Table of Contents to structure your study. You will find the book under "**Course Materials**." You will need Adobe Acrobat Reader to read the pdf files. *Reader 7.0* can be downloaded free from <http://www.adobe.com>. You can also download the text to your own computer free of charge. You will find it helpful to bring a hard copy to class as we discuss the material.

Regular Examinations

Three regular examinations will be given during the semester. *Examinations consist of multiple choice and true-false items.* The best way to study for the exams is to (1) master key terms in each chapter (vocabulary), (2) answer the questions at the end of each chapter, (3) bring questions to class for discussion, and (4) focus on the concepts addressed by the study questions and sample test questions.

Caution: objective questions will require more than recall of course material. Questions will target your ability to use concepts.

Legalized "Crib" Sheets

You may develop and use “crib sheets” for the Examinations 1 and 2. Each is limited to one sheet of 8 1/2" x 11" paper (both sides). Sign your crib sheet and submit it with your examination. You are encouraged to work with other students in developing your crib sheets. They will be returned to you for study. *A crib sheet may not be used for the final examination.*

Take-Home Statistics Examination

In past semesters, students were required to complete the statistics take-home exam which consisted of nine problems. Students were required to determine which statistic to use, analyze the data, and answer the questions.

The Take-Home Exam will not be used this semester.

Original Research Proposal

In past semesters, students have – usually behind my back :-> – complained that they did not understand *why they* needed to learn principles of design and analysis. I believe the process of constructing a research blueprint may help answer that question. You will have a choice of working alone, or working in pairs, to develop the proposal. **Chapter Two** of the textbook outlines the elements of an academic research proposal.

Late Penalty

Worksheets are due in class on the due date. *To help those who need the extra incentive: **Late worksheets will be docked 3 points. Assignments more than 2 weeks late will receive no credit*** (seminary policy.)

Classroom Instruction

There is no greater resource to your learning than the explanations, illustrations, and focused answers to your questions you'll get in class. Come every session and ask questions from your reading. Seminary policy states that **students who miss class more than 6 times will not pass a course.** This includes “excused absences.”

What About Course Load?

Here is a strong suggestion from past experience: You should have no more than 12 hours (including this course) in your course load this semester. If you do, you should seriously consider dropping this course until a later semester when you can give more time to it.

A Word of Encouragement

This course is designed to lead you progressively and successfully through research design and statistical analysis issues. I am here to help, not hurt. Together, we'll master some key skills that will help us evaluate present ministries and develop new ones. For those of you required to take the course, take comfort in the fact that your professors believe these languages help your critical thinking skills. For those of you electing this course, you will discover a new world of adventure and discovery.

A Word of Caution

You will not, unfortunately, learn this material simply by sporadic reading and listening. Defining, paraphrasing, comparing, contrasting, elaborating, questioning – all these skills are needed to learn the languages of design and analysis. Those who study a little each day – that is, reviewing, engaging professor and classmates with questions, organizing study around objectives, reading ahead – will do well. Those who put off “the pain” of study until deadlines will not. Ask for help – from classmates or from me – as soon as you begin feeling confused.

“And, lo, I am with you always, even to the end of the world.” Jesus

Even in a research and statistics course.

Disability Statement

Individuals with documented learning impairments who may need special circumstances for exams, classroom participation or assignments should contact the instructor the first week of the semester in order for special arrangements to be considered.

Research & Statistics 4383 - Spring 2006					
	Wednesday		Friday		
1			Introduction	1	Jan 13
2	Science and Faith 1	2	Symbiosis 2	3	Jan 18, 20
3	Measurement Types 3	4	Problem & Hypothesis 4	5	Jan 25, 27
4	Intro to Stat Analysis 5	6	Syn of Related Lit 6 (A1) Post Problem, Hypothesis, Statistic	7	Feb 1, 3
5	Sampling 7 Measurement Triad 8	8	Observation 9 Survey Research 10	9	Feb 8, 10
6	Testing 11 Attitude Scales 12	10	Experimental Designs 13 (A2) Post Initial Literature	11	Feb 15, 17
7	Examination 1	12	Math Review and Graphing 14, 15	13	Feb 22, 24
8	Focus and Scatter 16	14	The Normal Curve 17	15	Mar 1, 3
9	Error Rates 18	16	1-Sample tests 19 z- and t-tests	17	Mar 8, 10
*** SPRING BREAK ***					Mar 15, 17
10	2-Sample tests 20 Independent samples t	18	2-Sample tests 20 Matched samples t	19	Mar 22, 24
11	k-Sample test 21 ANOVA table	20	k-Sample test 21 Multiple Comparisons	21	Mar 29, 31
12	Correlation 22	22	Chi-square 23	23	Apr 5, 7
13	Examination 2	24	Ordinal Differences 24	25	Apr 12, 14
14	Factorial ANOVA 25 (A3) Post Proposal	26	Regression Analysis 26	27	Apr 19, 21
15	Proposal Evaluation 27 (A4) Two Evaluations	28	Final Exam	29-30	Apr 26, May ____ _____

Examination Objectives
Updated Spring 2006

Examination 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
- ...writing an apologetic for ministerial students: "Why study the scientific method?"

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 the 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 t-test, independent samples t-test, matched samples t-test, ANOVA, Mann Whitney U test, linear regression and multiple regression. (see pg. 50)

Learners will demonstrate understanding of writing 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"

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 between 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 doing such things as...

- ...differentiating between four kinds of measurement validity, three kinds of measurement reliability, and objectivity
- ...matching reliability tests (split-half and coefficient alpha, 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
- ...matching example test items with 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 doing 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.

Learners will demonstrate understanding of basic research vocabulary in chapter summaries by defining selected terms in their own words.

Examination Two

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 doing 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 (chs 17-18) by doing such things as...

- ...defining the standard Normal Curve
- ...differentiating between one-tail and two-tail statistical tests
- ...differentiating between frequency and sampling distributions
- ...computing a standard error of the mean from a set of data
- ...defining type I and type II error rate, and power in statistical testing
- ...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 in computing the 1-sample z, the 1-sample t, independent samples t and matched samples t test. (chs 19-20)

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

Learners will demonstrate understanding of correlation (ch 22) by matching research scenarios with the appropriate correlational procedure.

Learners will demonstrate understanding of Chi-Square procedures (ch 23) by doing such things as...
...differentiating between EE, PE and TI designs for computing expected frequencies
...computing three types of chi-square values, given sample data
...explaining four cautions in using the Chi-Square statistic

Learners will demonstrate understanding of basic statistical vocabulary in chapter summaries by defining selected terms in their own terms.

Final Examination

The Comprehensive Portion of the examination is based on same objectives for Exams 1 and 2. New material will be tested following these objectives:

Learners will demonstrate understanding of ordinal tests of difference (ch 24), and advanced ANOVA designs (ch 25) by answering conceptual questions concerning the following terms: sum of ranks, counterparts to parametric tests, interaction (ordinal, disordinal), main effects, simple effects, factorial designs (x -way), ANCOVA, and MANOVA.

Learners will demonstrate understanding of Regression Analysis (26) by answering questions by reading a regression print-out.

Learners will demonstrate understanding of basic research vocabulary in chapter summaries by defining selected terms in their own terms.