

PSYCHOLOGY 366

METHODS IN RESEARCH

2007-08

ADMINISTRATIVE OVERVIEW

Course Instructor: Statistics Lectures: **Dr. Ralph Hakstian**
(both terms) Kenny Rm. 2525; 604-822-5067
E-mail: rhakstian@psych.ubc.ca

Office Hours: Term 1:
T, 4:00–5:00 p.m.; W, 3:00–4:00 p.m.; Term 2: TBA.

- Course TAs:**
1. **Ms. Jennifer St. Onge**, Kenny Rm. 3506;
e-mail: stonge@interchange.ubc.ca.
Ms. St. Onge will be conducting all of the laboratory activities (experimental design; computer applications) in Term 1.
Office Hour (Term 1): W, 10:00–11:00 a.m.
 2. **Ms. Tracy Cassels**, Kenny Rm. 1103;
e-mail: tracy@psych.ubc.ca.
Ms. Cassels will be supervising the lab projects conducted in Term 2.
 3. **Ms. Marguerite Ternes**, Kenny Rm. 1118; 604-822-6130
e-mail: mrodgers@interchange.ubc.ca.
Ms. Ternes is the TA (both terms) for the lecture material.
Office Hour: T, 2:30–3:30 p.m.

Schedule:

Lectures: (Both terms) T, Th, 11:00 a.m.–12:30 p.m., Angus 213

Labs: **Term 1:** T or Th, 12:30–2:00 p.m., Scarfe 204 (experimental design labs, week of Sept. 10 to week of Oct. 8); Buchanan 111 and 114 (computer labs, week of Oct. 15 to week of Nov. 26).

Term 2: The T, Th 12:30–2:00 p.m. period has been booked in Scarfe 204 for any lab meetings that the Term 2 TA (Ms. Cassels) decides are necessary.

COURSE DESCRIPTION

Psychology 366 is a full-year course in behavioural research methodology, and, as such, is concerned with the design of behavioural studies and the analysis of the data gathered in them. The material covered in the lecture part of the course deals with behavioural statistical methods described in the course outline below. The lab part of the course deals, in Term 1, with principles and procedures of experimental design and the use of available computer software in data analysis. The lab activities follow the schedule noted above, and consist of formal training in both experimental design and computer data-analytic applications.

In Term 2, the lab work consists largely of students working at their own pace—and generally without regularly-scheduled lab meetings—on their course research projects. These latter projects, which call for the execution and detailed write-up—using standard reporting conventions—of an empirical study on a topic of interest to the student, will be done in consultation with Ms. Cassels.

EVALUATION

The following forms of student evaluation will be employed in this course. The percentage weight that each carries in the total course grade is given in parentheses.

Lecture Material (66% of Course Grade):

- | | |
|--------------------------|----------------------------------------------------------------------------------------------------------------------|
| (a) Fall Midterm (11%) | 16 October 2007 (in regular class time) |
| (b) Midyear Exam (22%) | December exam period (1/4 of this exam will be on pre-midterm material; 3/4 on post-midterm topics) |
| (c) Spring Midterm (11%) | 26 February 2008 (all on Term 2 material; in regular class time) |
| (d) Final Exam (22%) | April exam period (1/4 on topics between the beginning of Term 2 and the spring midterm; 3/4 on post-midterm topics) |

(NOTE: all examinations noted above will employ the multiple-choice format.)

Laboratory Material (34% of Course Grade):

- | | |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (a) Fall Lab Work (16%) | Lab assignments and tests given at various times in Term 1. |
| (b) Course Research Project (18%) | Individual empirical study done during Term 2;
Due Date for completed project: 11 April 2008 ;
<i>Note:</i> This due date is a "hard" date (i.e., no extensions will be granted). |

(NOTE: all evaluation results may be scaled—up or down—to keep final grades in line with faculty and university expectations. See Page 6 of this document for more detail.)

Make-Up Examination Policy:

All students are expected to write all examinations (on both the lecture and lab material) *at the scheduled time and place*. Exceptions will be made only on the basis of **documented** medical or compassionate reasons. In the absence of such a legitimate excuse, students missing an exam will be assigned a mark of 0 for that exam. Students with a documented and acceptable excuse will be permitted to take a make-up examination *as soon as circumstances permit*. Students should read carefully the University's stated policy in this regard—i.e., concerning acceptable reasons for examination postponements—found in the *UBC Calendar*.

COURSE TEXTS

Lecture Topics:

- Glass, G. V. & Hopkins, K. D. (1996). *Statistical methods in education and psychology* (3rd ed.). Boston: Allyn and Bacon.

COURSE TEXTS (CONTINUED):

Lab Topics:

Cozby, P. C. (2006). *Methods in behavioral research* (9th ed.). New York: McGraw-Hill.

In addition, for one topic covered in the second term in the statistics part of the course, a chapter from another textbook will be duplicated and made available to students, by the UBC Bookstore, at a nominal cost. Students will be informed when this chapter is needed and available.

PREPARATION AND STUDY SUGGESTIONS

Psychology 366 has no university-level prerequisites in Mathematics. The topics are developed without recourse to calculus. It is assumed, however, that students have familiarity and competence with basic arithmetic and high-school algebra. Students who have been away from these topics for some time are urged to review them as early as possible in the course. Probably the most important work-habit principle for students to internalize is that of *keeping up with the material as it is presented*. Particularly in the statistics part of the course, each topic covered depends to some extent on what has gone before, and students who have not kept current with the material will find that the lectures rapidly become much more difficult to follow and, as a result, less useful to them. Students will be informed about upcoming topics and their location in the textbook, and pre-reading of these topics before they are covered in class will make a big difference in what the student gets out of the lectures. Similarly, reviewing each day's lecture notes as soon as possible after class and ensuring that they are clear is strongly recommended.

OUTLINE OF TOPICS (LECTURE/STATISTICS PART OF COURSE)

The following topics, along with their location in the textbook, will be covered in the lecture part of this course, in the order presented below. The lab TA will provide a topical outline of the Term 1 lab activities.

A. Descriptive Statistics:

1. Introductory material; scales of measurement, summation notation; Text, Chs. 1 and 2, Secs. 4.4, 4.6–4.10, and 5.6.
2. Distributing data; tabular and graphic representation; properties of graphed frequency distributions. Text, Ch. 3, omitting Secs. 3.8–3.10
3. Measures of central tendency; quantiles, percentiles. Text, Ch. 4; Sec. 3.8 done here.
4. Measures of variability. Text, Ch. 5.
5. The normal curve, skewness, kurtosis, data transformations, and standard scores. Text, Ch. 6.
6. Correlation I. Basic concepts and computations; varieties of correlation. Text, Ch. 7.
7. Correlation II. Regression: formulations and problems. Text, Ch. 8, omitting Secs. 8.11, 8.14, 8.20–8.23, and 8.26–8.30.

OUTLINE OF TOPICS (*Continued*):

B. Inferential Statistics:

1. Statistical Inference I. Sampling and estimation. Principles of sampling, sampling errors, sampling distributions, standard errors, properties of estimators. Text, Ch. 10.
2. Statistical Inference II. Hypothesis testing. The null hypothesis, Type I and II errors, non-directional and directional tests, interval estimation of means, the *t*-distribution. Text, Ch. 11, omitting Sec. 11.15.
3. Some Selected Inferential Techniques. Testing hypotheses concerning means, correlation coefficients, and variances. Text, Chs. 12, 14, and 16 (Sec. 16.7 only), omitting Secs. 12.7, 12.17, 14.7, 14.9, 14.17, 14.20, and 14.21; handouts.
4. The analysis of categorical data. Testing hypotheses concerning proportions. Text, Ch. 13, omitting Secs. 13.9, 13.14; handouts.
5. The Analysis of Variance I, Fixed-Effects Model. One-way layouts and computational details, writing the ANOVA table, assumptions and their tests, power. Text, Ch. 15, omitting Sec. 15.20, 15.29–15.30; Text, Sec. 16.9.
6. The Analysis of Variance II. Multiple comparison techniques: logic, principles, and computational details; planned orthogonal contrasts, Tukey and Scheffé contrasts. Text, Ch. 17, Secs. 17.1–17.3, 17.5, 17.8–17.9, 17.12, 17.15–17.16, 17.24–17.26.
7. The Analysis of Variance III. Factorial and repeated-measures designs: applications, data layouts, computational details, assumptions and the effects of their violation. Text, Ch. 18, Secs. 18.1–18.17, 18.19, and a chapter from Howell (see alternate sources below)—provided through the Bookstore—on repeated-measures designs.

ALTERNATE SOURCES

Sometimes students find certain statistical topics explained better in textbooks other than the course text, although Glass and Hopkins is an excellent book. A list follows of alternate statistics books written for students in the behavioural sciences and covering largely the same topics as the course text. These books—some of them quite old—have all been considered excellent statistics texts. Where possible, these books have been placed on 2-hour loan in Koerner Library.

At Approximately the Same Difficulty Level as the Course Text:—

- Ferguson, G. A., & Takane, Y. (1989). *Statistical analysis in psychology and education* (6th ed.). McGraw-Hill.
- Guilford, J. P., & Fruchter, B. (1973). *Fundamental statistics in psychology and education* (5th ed.). McGraw-Hill.
- Marascuilo, L. A., & Serlin, R. C. (1988). *Statistical methods for the social and behavioral sciences*. Freeman.

ALTERNATE SOURCES (Continued):

At Approximately the Same Difficulty Level as the Course Text:—

- McNemar, Q. (1969). *Psychological statistics* (4th ed.). Wiley.
- Shavelson, R. J. (1996). *Statistical reasoning for the behavioral sciences* (3rd ed.). Allyn and Bacon.
- Jaccard, J., & Becker, M. A. (2002). *Statistics for the behavioral sciences* (4th ed.). Wadsworth.
- Howell, D. C. (2006). *Statistical methods for psychology* (6th ed.). Thomson.

At a Lower Difficulty Level than the Course Text:—

- Gravetter, F. J., & Wallnau, L. B. (2007). *Essentials of statistics for the behavioral sciences* (6th ed.). Nelson.
- Hopkins, K. D., Glass, G. V., & Hopkins, B. R. (1996). *Basic statistics for the behavioral sciences* (3rd ed.). Allyn and Bacon.
- Pagano, R. R. (2006). *Understanding statistics in the behavioral sciences* (8th ed.). Wadsworth.
- Thorndike, R. M. (1982). *Data collection and analysis: Basic statistics*. Gardner.
- Moore, D. S. (2006). *The basic practice of statistics* (4th ed.). Freeman.
- Kirk, R. E. (2007). *Statistics: an introduction* (5th ed.). Wadsworth.
- Howell, D. C. (2007). *Fundamental statistics for the behavioral sciences* (6th ed.). Wadsworth.

At a Higher Difficulty Level than the Course Text (and, in some cases, featuring analysis of variance techniques):—

- Hays, W. L. (1994). *Statistics* (5th ed.). Harcourt Brace.
- Keppel, G., & Wickens, T. D. (2004). *Design and analysis: A researchers' handbook*. Pearson.
- Kirk, R. E. (1995). *Experimental design: Procedures for the behavioral sciences* (3rd ed.). Brooks/Cole.
- Myers, J. L., & Well, A. D. (1991). *Research design and statistical analysis*. Allyn and Bacon.
- Winer, B. J., Brown, D. R., & Michels, K. M. (1991). *Statistical principles in experimental design* (3rd ed.). McGraw-Hill.

The Hays, Kirk, and Winer et al. books above are regarded as classics in the field. These will be most useful in connection with the ANOVA coverage in Term 2.

OFFICIAL DEPARTMENT OF PSYCHOLOGY POSITION ON ACADEMIC MISCONDUCT

Cheating, plagiarism, and other forms of academic misconduct are very serious concerns of the University, and the Department of Psychology has taken steps to alleviate them. In the first place, the Department has implemented software that, can reliably detect cheating on multiple-choice exams by analyzing the patterns of students' responses. In addition, the Department subscribes to *TurnItIn*--a service designed to detect and deter plagiarism. All materials (term papers, lab reports, etc.) that students submit for grading will be scanned and compared to over 5 billion pages of content located on the Internet or in TurnItIn's own proprietary databases. The results of these comparisons are compiled into customized "Originality Reports" containing several, sensitive measures of plagiarism; instructors receive copies of these reports for every student in their class.

In all cases of suspected academic misconduct, the parties involved will be pursued to the fullest extent dictated by the guidelines of the University. Strong evidence of cheating or plagiarism may result in a zero credit for the work in question. According to the University Act (section 61), the President of UBC has the right to impose harsher penalties including (but not limited to) a failing grade for the course, suspension from the University, cancellation of scholarships, or a notation added to a student's transcript.

All graded work in this course, unless otherwise specified, is to be original work done independently by individuals. Do **not** use Google/Yahoo/MSN Search/etc. to find articles for assignments in this course. **Do** use any of the indexes and databases listed under Indexes and Databases, Subject Resources, OneSearch or Metasearch on the Library's website at <http://www.library.ubc.ca>. (Not sure which index to use? Click HELP on the library homepage at www.library.ubc.ca or try Subject Resources.)

If you have any questions as to whether or not what you are doing is even a borderline case of academic misconduct, please consult your instructor. For details on pertinent University policies and procedures, please see Chapter 5 in the UBC Calendar (<http://students.ubc.ca/calendar>).

OFFICIAL DEPARTMENT OF PSYCHOLOGY POLICY ON GRADE DISTRIBUTIONS AND SCALING

In order to reduce grade inflation and maintain equity across multiple course sections, all psychology courses are required to comply with departmental norms regarding grade distributions. According to departmental norms, the mean grade in a 300-level class is 70 for a good class, 68 for an average class, and 66 for a weak class, with a standard deviation of 13). The corresponding figures for 100- and 200-level Psychology courses are 67, 65, and 63, with a standard deviation of 14. **Scaling** is likely to be used in order to comply with these norms; grades may be scaled up or down as necessary by the professor or department.

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5. The normal curve, skewness, kurtosis, data transformations, and standard scores. Text, Ch. 6.
6. Correlation I. Basic concepts and computations; varieties of correlation. Text, Ch. 7.
7. Correlation II. Regression: formulations and problems. Text, Ch. 8, omitting Secs. 8.11, 8.14, 8.20–8.23, and 8.26–8.30.

OUTLINE OF TOPICS (Continued):

B. Inferential Statistics:

1. Statistical Inference I. Sampling and estimation. Principles of sampling, sampling errors, sampling distributions, standard errors, properties of estimators. Text, Ch. 10.
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3. Some Selected Inferential Techniques. Testing hypotheses concerning means, correlation coefficients, and variances. Text, Chs. 12, 14, and 16 (Sec. 16.7 only), omitting Secs. 12.7, 12.17, 14.7, 14.9, 14.17, 14.20, and 14.21; handouts.
4. The analysis of categorical data. Testing hypotheses concerning proportions. Text, Ch. 13, omitting Secs. 13.9, 13.14; handouts.
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6. The Analysis of Variance II. Multiple comparison techniques: logic, principles, and computational details; planned orthogonal contrasts, Tukey and Scheffé contrasts. Text, Ch. 17, Secs. 17.1–17.3, 17.5, 17.8–17.9, 17.12, 17.15–17.16, 17.24–17.26.
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All graded work in this course, unless otherwise specified, is to be original work done independently by individuals. Do **not** use Google/Yahoo/MSN Search/etc. to find articles for assignments in this course. **Do** use any of the indexes and databases listed under Indexes and Databases, Subject Resources, OneSearch or Metasearch on the Library's website at <http://www.library.ubc.ca>. (Not sure which index to use? Click HELP on the library homepage at www.library.ubc.ca or try Subject Resources.)

If you have any questions as to whether or not what you are doing is even a borderline case of academic misconduct, please consult your instructor. For details on pertinent University policies and procedures, please see Chapter 5 in the UBC Calendar (<http://students.ubc.ca/calendar>).

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