Syllabus for Psychology 492
Psychological Measurement
Winter, 2007

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Teaching Assistants: Office Hours
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Huiwen Lian   PAS 4232   hlian@artsmail.uwaterloo.ca   Fridays 3-5pm

Class Time and Location: Monday 2:30-4:20, Wednesday 2:30-4:20, MC 2065

Textbook:
Kaplan, R.M. & Saccuzzo, D.P. (2005). Psychological Testing: Principles, Applications and Issues. Belmont,
    CA: Wadsworth.

Additional Reading:
Trochim, William M. The Research Methods Knowledge Base, 2nd Edition. Internet WWW page, at URL:
<http://trochim.human.cornell.edu/kb/index.htm> (version current as of October 20, 2006). Read only the
section on construct validity, with special attention to nomological networks.

Course Objectives:
    Measurement is fundamental to science. Theory tests in most sciences generally involve specific
predictions requiring controlled and accurate observations. In psychology, we are faced with the problem of
measuring variables such as "intelligence," or "aggressiveness" that are inferred from behaviour or self-
report. How can we tell if the tests we create are really measuring what we think they are? How can we
estimate the precision of our tests? This course will tell you. You will learn not only how to evaluate
psychological tests and measures, but also how to construct and refine your own. This knowledge is
invaluable in both research and applied settings, as our research results and clinical/applied evaluations are
dependent on the tests and measures we use.

Course Structure:
    This course is a hybrid between a statistics course and a research methods course. The lecture sessions
will be run similar to those of a statistics course, and we will concurrently participate in a research workshop
wherein each class member designs a measure, collects data, and analyzes his or her data..
    In the lectures we will go over the content of the assigned readings step-by-step, in order to learn the
basic material. Please read the assigned readings in preparation for the class. Try to avoid leaving the
reading until just prior to the exam. In addition to attending the lectures, there will be weekly assignments
involving application of the concepts from the chapter in the textbook and the lecture material.
    As the course unfolds I will assist you in an independent project, which will require individual research
and a small amount of written work from each of you. This will be a measure construction project, intended
to help you learn how to devise and refine a psychological test. The project will involve carefully
researching a construct of interest, preparing a clear construct definition, and inventing a test to measure this
construct. In-class data collection will be used to provide data for practicing a psychometric analysis, and
analysis of convergent and discriminant validity.

Evaluation:

Your grade in this course will be based on the following:

1. Your performance on 3 midterm exams given in the lecture sessions. Each test will include questions on lectures and readings related to primarily those topics covered since the previous exam. The exams will each be worth 20% of the course grade (for a total of 60% of course grade).

2. Completion of sections of the lab project (lab assignments), according to deadlines specified throughout the term. There are 8 such sections, worth a total of 28% of course grade. Lab assignments A through D are worth 2 marks each, while E through G are worth 5 marks each. Late penalty is 1 mark per day for all lab assignments, so a section worth 2 marks could get a grade no better than 1 mark out of 2 if submitted a day late.

3. Completion of assignments due throughout the term. There are 5 assignments, worth 2 marks each for a combined total of 10% of course grade. Grading will be 2 marks for a completed assignment submitted on time with most questions answered correctly, and a single mark for an assignment with less than half of the questions answered correctly or an incomplete assignment. Keep in mind that there is indirect benefit from completion of the assignments because doing so will help prepare you for the exams.

Here is a complete listing of grades and deadlines:

Due Date	Description	Grade
January 24	Assignment 1	2
January 24	Lab Assignment A	2
January 31	Assignment 2	2
January 31	Lab Assignment B	2
February 5	Midterm 1	20
February 7	Lab Assignment C	2
February 14	Assignment 3	2
February 26	Midterm 2	20
March 7	Lab Assignment D	2
March 7	Lab Assignment E	5
March 12	Assignment 4	2
March 19	Assignment 5	2
March 21	Midterm 3	20
March 28	Lab Assignment F	5
April 9	Lab Assignment G	5
April 9	Lab Assignment H	5

Note for Students with Disabilities

Note for students with disabilities: The Office for Persons with Disabilities (OPD), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term.

A Few Other Notes

All students should activate their UW computer accounts each term. The accounts give students access to applications such as word processing, statistical and graphics packages, and electronic email as well as access

to the Internet. For those who are not planning to use their UW email addresses, please do one of the following things:

- change your email address on QUEST to the one that you want posted on the University Directory, or
- on the UW account, arrange for the email from your UW account to be forwarded to your alternate email address.

Psychology majors should check the Psychology Undergraduate Web Site (http://www.psychology.uwaterloo.ca/ugradprog/) regularly for updates (e.g., psychology course offerings for F/W/S, volunteer and/or part-time paid research positions, application deadlines for scholarships, etc.)

Note on avoidance of academic offences: All students registered in the courses of the Faculty of Arts are expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for their actions. When the commission of an offence is established, disciplinary penalties will be imposed in accord with Policy #71 (Student Academic Discipline). For information on categories of offences and types of penalties, students are directed to consult the summary of Policy #71 which is supplied in the Undergraduate Calendar (section 1; on the Web at www.adm.uwaterloo.ca/infousec/Policies/policy71.htm). If you need help in learning what constitutes an academic offence; how to avoid offences such as plagiarism, cheating, and double submission; how to follow appropriate rules with respect to "group work" and collaboration; or if you need clarification of aspects of the discipline policy, ask your TA and/or your course instructor for guidance. Other resources regarding the discipline policy are your academic advisor and the Undergraduate Associate Dean.

For more information on categories of academic offenses, most notably plagiarism, see "Avoiding Academic Offences" (http://arts.uwaterloo.ca/arts/ugrad/academic_responsibility.html).

Students who believe that they have been wrongfully or unjustly penalized have the right to grieve; refer to Policy #70, Student Grievance, http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm

Final Note: **This syllabus may be modified slightly as the term progresses. In particular, office hours will need to be selected and may need to change.** *If there is a discrepancy between a hard copy syllabus and the outline posted on ACE, the outline on ACE will be deemed the official version.*

Lecture Schedule

<u>Approximate Time Table</u>

Week 1

    January 3   Discussion of Syllabus, Introduction to the Course

Week 2

    January 8   Introduction to Tests and Measurement
                                  Chapter 1

    January 10   Philosophy of Science, Constructs and Nomological Networks
                       Reading: Trochim, William M. The Research Methods Knowledge Base, 2nd
                                  Edition. Internet WWW page, at URL:
                                  <http://trochim.human.cornell.edu/kb/index.htm> Read only the section
                                  on construct validity, with special attention to nomological networks.

Week 3

    January 15   Norms and Basic Statistics
                                  Assignment 1 (Norms and Basic Statistics)
                                  Chapter 2

    January 17   Constructs and Measures, Review of Literature Research Tools
                                  Lab Assignment 'A' (Reference List)

Week 4

    January 22   Correlation and Regression
                                  Assignment 2 (Correlation and Regression)
                                  Chapter 3

    January 24   Process of Test Construction and Item Writing
                                  Chapter 6 (pages 157-168)
                                  Construct Definition and Domain Specification
                                  Lab Assignment 'A' due
                                  Lab Assignment 'B' (Construct Definition & Domain Spec.)
                                  Assignment 1 Due & Reviewed

Week 5

    January 29   Reliability
                                  Chapter 4 (pages 99-113)

    January 31   No lecture
                                  Assignment 2 Due & Reviewed
                                  Lab Assignment 'B' Due
                                  Lab Assignment 'C' (Preliminary Version of Measure)

Week 6

February 5	**Midterm 1 (Norms & Basic Statistics; Correlation & Regression) (Note: does not include material presented last week)**
February 7	Some Applications of Classical Test Theory Lab Assignment 'C' Due Assignment 3 (Classical Test Theory and Applications) Chapter 4 (review pages 99-113; read pages 114-128)

Week 7

February 12	Validity Chapter 5
February 14	Review of Midterm 1 Assignment 3 Due & Reviewed

Reading Week

February 19, 21

Week 8

February 26	**Midterm 2 (Classical Test Theory and Applications) (Note: does not include material presented Feb 12)**
February 28	Testing in Industrial and Business Settings Chapter 18

Week 9

March 5	Item Review, Item Analysis Assignment 4 (Decision Theory, Selection, Incremental Validity, Item Analysis, Item Discrimination, ICCs) Lab Assignment 'D' (Final Version of Measure) Chapter 6 (pages 168 -181)
March 7	Lab Assignment 'E' (Data Collection)

Week 10

March 12	Kappa Coefficient, Bayes' Theorem Re-Read Chapter 4 (pages 117-119) Re-Read Chapter 18 (pages 512-521) Assignment 4 Due & Reviewed Assignment 5 (Kappa Coefficient, Bayes' Theorem)
March 14	Data Entry, Data Checking, Reverse Scoring, Item Analysis Lab Assignment 'F' (Data Entry & Item Analysis)

Week 11

March 19	Factor Analysis	
	Re-Read Chapter 3 (pages 89-92)	
	Assignment 5 Due & Reviewed	

March 21   **Midterm 3 (Validity, Selection, Decision Theory, Bayes' Theorem, Item Analysis)**

Week 12

March 26   Alternative Approaches to Test Construction, Emergent Constructs
Chapter 13

March 28   Reliability Analysis and Factor Analysis Using SPSS
Lab Assignment 'F' Due
Lab Assignment 'G' (Reliability Analysis and Factor Analysis)

Week 13

April 2   Review & Summary
Evaluating Convergent and Discriminant Validity
Lab Assignment 'H' (Convergent and Discriminant Validity)
Questions concerning Lab Assignments 'F' and 'G'
Review Midterm 3

Lab Assignments 'G' and 'H' Due April 9