**PSY 600K: Advanced Psychology – Measurement**

**Dr. Alyssa Gibbons**

**Spring 2018**

**Days and Times: Location:**

Monday & Wednesday 9:00 – 10:15 AM Clark C68

**Instructor: Office Hours:**

Alyssa Mitchell Gibbons, PhD Tuesdays 10:30-11:30 AM

Behavioral Sciences 227 and by appointment

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**Course Website:**

Via Canvas: <https://canvas.colostate.edu/> (login with your EID and password)

**Required Texts and Readings:**

DeVellis, R. F. (2012). *Scale development: Theory and applications (3rd edition).* Los Angeles: Sage. ISBN: 978-1412980449

Raykov, T., & Marcoulides, G. A. (2011). *Introduction to psychometric theory.* New York: Taylor & Francis. ISBN: 978-0415878227

Please note that **both** texts are required (as textbooks go, they are reasonably affordable even when purchased together). Also, make sure you purchase the 3rd edition of the DeVellis book, as it has been significantly revised since the 2nd edition.

Additional required readings will be made available in PDF form through the course website (see above).

**Lab (Co-requisite):**

PSY 601, Measurement Laboratory, is intended as a co-requisite for this course. The lab is designed to give you hands-on practice in applying the course material, using various software programs that are useful for measurement, including Excel, R, and Mplus. **If you are not planning to enroll in the lab, please talk with me in the first week of the semester**. The lab meets:

Friday 10:10 – 11:50 AM Clark C79

**Recommended Software:**

All software programs needed for the course and the lab activities are available in the Clark C6 graduate student lab. However, you may wish to obtain personal copies of these programs for your own convenience and your future research use.

R is a free (but highly respected and widely used) program that can be downloaded from:

<http://www.r-project.org/>

In lab, I will use the RStudio interface to work with R. RStudio is also free (you don’t need a commercial license!) and available here:

<https://www.rstudio.com/products/rstudio/>

Mplus is a proprietary (but also highly respected) program available from:

<http://www.statmodel.com/>

You can download the demo version of Mplus for free. The demo version will be sufficient for all lab activities, but may be less useful for the project and your own research because it is limited to a maximum of 6 independent and 2 dependent variables. A student license, identical to the full version, is also available for a cost of $195. This is in no way required for the course, but it is an excellent investment if your future plans include sophisticated statistical analyses.

**Course Overview:**

The goal of this course is to provide students with a strong understanding of the core principles of psychological testing and measurement. This requires a dual emphasis on psychometric theory and on practical measurement skills. By the end of the course, students should be able to: explain and apply the basic principles of classical test theory, including both historical and contemporary perspectives; develop basic measures of psychological constructs; assess the reliability, dimensionality, and validity of such measures, using both traditional and modern views of validity; and possess a broad familiarity with current issues in testing and measurement.

**Performance Opportunities and Grading:**

Your grade for this course will be determined as follows, based on your performance in the following areas:

Midterm Exam 80 points

Final Exam 80 points

Project Steps 40 points

Final Project 80 points

Reading Responses 60 points

Participation 20 points

Total 360 points

Final letter grades will be determined as follows:

|  |  |  |
| --- | --- | --- |
| Points | % | Grade |
| 322 – 360 | 89.5% -100% | A |
| 286 – 321 | 79.5% - 89.4% | B |
| 250 – 285 | 69.5 % - 79.4 % | C |

**Exams.** There will be a midterm exam and a final exam. Both exams will be given in take-home format. Unless you have made alternate arrangements with me in advance, exams are due by **midnight** on the due date and should be turned in via Canvas. Exams are scenario-based and may include short answer, computational, essay, and other item types. Please read the instructions for each item carefully and answer only the question that is asked. For computational items, always show or explain your work as far as possible. You may need access to software for some exam items; plan ahead.

**Project.** Over the course of the semester, you will work with a small group of other students to develop and pilot test a new brief scale to measure an attitude or personality characteristic. Detailed guidelines for the project are available on Canvas; I recommend that you become familiar with these early in the semester. There are several intermediate steps, each with its own due date (see the course schedule at the end of this syllabus). We will collect new data for this project as a class, therefore it is important that you meet deadlines for the intermediate steps or you may delay the class as a whole.

Please note: You will work in groups to develop and analyze your scale, but each member of the group must submit an **individual** final report written **entirely** in your own words, demonstrating that you fully understand all aspects of the project.

We will collect data online through friends and personal contacts. The final project report, due in finals week, will consist of a preliminary validation of the properties of your new scale.

**Reading Responses.** So that I can keep track of students’ understanding of the material and tailor the lectures appropriately, you will be asked to complete several short “Reading Response” writing assignments across the semester. Approximately once per week, I will post a question in the “Assignments” section of Canvas and ask you to respond. Generally, these questions will ask you to explain a class concept or summarize an argument in your own words, or to apply a class principle in a given scenario. These questions will usually cover reading assignments **in advance** of lecture, so that I can assess what you understand and what I should spend more time on in class.

Your responses should be a good paragraph or so – these are not meant to be long nor particularly formal, but you should explain your thoughts as clearly and completely as you can. Each response is worth up to **5** points, and there will be a total of **13** questions posted across the semester. Note that full credit for this portion of the course is 60 points (**5 points x 12 assignments**), so if you miss one writing assignment it will not damage your grade. Reading responses are due at **9:00 PM** on the due date in Canvas; you may submit them either directly in the assignment box in Canvas or as an attachment. Late responses can be submitted, but you will lose 1 point for each day they are late, including weekends (so they must be submitted within 4 days).

**Participation.** I expect you to attend class regularly, to prepare for class, and to participate in discussions. To receive full participation points, I expect to hear your voice at least once in every class period. If you must be absent from class, do your best to keep up with readings and exercises and obtain notes from a classmate or from me.

**Course Policies & Expectations:**

Students in this course represent a wide variety of backgrounds, experiences, and research interests. You should treat each other with respect and professional courtesy at all times.

The syllabus is subject to change depending on the abilities and interests of the students and the pace we find most comfortable. If I need to alter the syllabus, I will announce the changes in class and post an amended version on Canvas.

This is a challenging course covering a great deal of technical material. I expect you to keep up with readings and exercises and to inform me immediately if you are having difficulty doing so.

I am generous with extensions when given ample notice (24 hours minimum except in case of legitimate emergency), an honest explanation of the delay, and a reasonable estimate of when you believe you can have the exercise/exam/etc. completed. Requests for more than two extensions in a semester will require significantly more impressive extenuating circumstances.

You are strongly encouraged to take advantage of office hours. I will do my best to answer questions submitted by email, but in many cases a face-to-face conversation may be more effective. If my regular office hours are not convenient for you, you may always email for an appointment. Please suggest several possible meeting times.

I welcome your feedback on all aspects of the course. I will provide you with some formal opportunities for feedback during the semester, but you are welcome to email me or talk to me with concerns, comments, etc. at any time. I want to make this an effective learning environment for you, but please keep in mind that I have multiple students’ needs and other practical factors to consider. I may not always be able to accommodate your preferences.

**PSY 600K & 601 Integrated Course Schedule**

Subject to change – check Canvas for updated versions.

| **Date** | **Topic** | **DeVellis**  **Reading** | **R&M**  **Reading** | **Additional**  **Reading** | **Due** | **Reading Response** |
| --- | --- | --- | --- | --- | --- | --- |
| 1/16 | Course Intro, Syllabus |  |  |  |  |  |
| 1/18 | History & Context | Ch. 1 |  |  |  |  |
| 1/19 | *Lab 1: Reading Math* |  |  |  |  |  |
| 1/23 | Constructs |  | 1.1 - 1.7 |  |  | 1 |
| 1/25 | A Brief Overview of Validity | Ch. 4 |  | SIOP (2003), pp. 4-10 |  |  |
| *1/26* | *Lab 2: Getting More out of Excel* |  |  |  |  |  |
| 1/30 | Items & Item Writing | pp. 73 - 85 |  | Burisch (1984) |  | 2 |
| 2/1 | Response Formats & Scales | pp. 85 - 104 |  |  | Project Plan |  |
| *2/2* | *Lab 3: Item Writing* |  |  |  |  |  |
| 2/6 | Critical Statistical Concepts |  | 2.1 - 2.7 |  |  | 3 |
| 2/8 | Classical Test Theory | Ch. 2 |  |  |  | 4 |
| *2/9* | *Lab 4: Intro to R and Matrix Algebra* |  | 2.8 |  |  |  |
| 2/13 | CTT-Based Models |  | 5.1 - 5.3 |  |  |  |
| 2/15 | Reliability | Ch. 3 | 6.1, 7.1 |  | Initial Items |  |
| *2/16* | *Lab 5: Navigating R & Mplus* |  |  |  |  |  |
| 2/20 | Coefficient Alpha |  | 6.2-6.4; 7.2-7.4 | Schmidt & Hunter (1986)  *opt. Cortina (1993)* |  | 5 |
| 2/22 | The Common Factor Model | pp. 115 - 125 | 3.1 - 3.4 |  |  |  |
| *2/23* | *Lab 6: Reliability* |  |  |  |  |  |
| 2/27 | Exploratory Factor Analysis | pp. 125 - 132 | 3.6 - 3.10 |  |  | 6 |
| 3/1 | Issues in EFA | pp. 132 - 151 | 3.5; 4.1 - 4.2 | Bandalos & Boehm-Kaufman (2008) | Content Evidence | 7 |
| *3/2* | *Lab 7: EFA in Mplus* |  |  |  |  |  |
| 3/6 | Catch Up |  |  |  |  |  |
| 3/8 | **Work Day (in class or out)**  Midterm Handed Out |  |  |  | ALL Final Items |  |
| *3/10* | *Lab 8: More About EFA* |  |  |  |  |  |
| 3/13 | *Spring Break* |  |  |  |  |  |
| 3/15 | *Spring Break* |  |  |  |  |  |
| *3/16* | *Spring Break* |  |  |  |  |  |
| 3/20 | Confirmatory Factor Analysis |  | 4.3 - 4.5; 5.4 - 5.6 |  |  |  |
| 3/22 | Issues in CFA |  | 7.5 - 7.6 |  | Midterm Exam | 8 |
| *3/23* | *Lab 9: Single Factor CFA in Mplus* |  |  |  |  |  |
| 3/27 | Classical Item Analysis | pp. 104 - 108 | 4.6 | McDonald (1999), Ch. 11 |  | 9 |
| 3/29 | Validity: Content & Response Processes |  | 8.1 - 8.3 |  |  |  |
| *3/30* | *Lab 10: Multiple Factor CFA* |  |  |  |  |  |
| 4/3 | Validity: Criterion Relationships |  | 8.4 |  |  | 10 |
| 4/5 | Validity: Criterion Relationships, cont. |  | 8.6 - 8.8 |  |  |  |
| 4/6 | *Lab 11: Classical Item Analysis* |  |  |  |  |  |
| 4/10 | Validity: Construct Relationships |  | 8.5, 8.9 |  |  | 11 |
| 4/12 | Validity: Consequences | pp. 110 - 114 |  | Drasgow & Kang (1984) |  |  |
| *4/13* | ***Project Work Day*** |  |  |  |  |  |
| 4/17 | Validity Scales / Detecting Faking |  |  | Schmitt & Oswald (2006); Piedmont et al. (2000) | Analysis Check-In | 12 |
| 4/19 | NO CLASS – SIOP CONFERENCE |  |  |  |  |  |
| *4/20* | *NO LAB – SIOP CONFERENCE* |  |  |  |  |  |
| 4/24 | Measurement Equivalence |  |  | Vandenberg & Lance (2000) |  |  |
| 4/26 | Practical Considerations in Test Development | pp. 101 - 102 |  |  |  |  |
| *4/27* | *Lab 12: MGCFA* |  |  |  |  |  |
| 5/1 | Introduction to IRT | Ch. 7 |  |  | First Draft (optional) |  |
| 5/3 | Useful Concepts in IRT;  Final Exam Handed Out |  | 11.1 – 11.6 |  |  | 13 |
| 5/4 | *Lab 13: Basic IRT in Mplus* |  |  |  |  |  |
| 5/7  (MON) | *Final Project Deadline*  *No Class - Finals Week* |  |  |  | Final Project |  |
| 5/10  (THU) | *Final Exam Due @ Midnight* |  |  |  | Final Exam |  |

\*Reading responses are due at 9:00 PM the day **BEFORE** they are indicated here, so that I have an opportunity to review them before the relevant lecture. Thus, the first reading response is due on Monday 1/22 at 9:00 PM, etc. Note that they are sometimes due on Mondays and sometimes on Wednesdays (it is not always the same each week).