**PSY 601: Measurement Lab**

**Dr. Alyssa Gibbons**

**Spring 2018**

**Days and Times: Location:**

Friday 10:10 – 11:50 AM Clark C79

**Instructor: Office Hours:**

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

Behavioral Sciences 227 and by appointment

(970) 491-4940

[Alyssa.Gibbons@colostate.edu](mailto:Alyssa.Gibbons@colostate.edu)

**Course Website:**

Via Canvas: <https://canvas.colostate.edu/> (login with your EID and password) – note that there are SEPARATE Canvas courses for PSY 600K and PSY 601.

**Required Resources:**

*Mplus User’s Guide* (available for free download from <http://www.statmodel.com/ugexcerpts.shtml>).

Additional handouts will be provided by the instructor via Canvas.

**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.

**Software Resources:**

For R help:

[www.statmethods.net](http://www.statmethods.net) (great resource for converting from SPSS to R)

[www.rseek.org](http://www.rseek.org) (allows you to search R-specific discussion boards, etc.)

<https://cran.r-project.org/doc/contrib/Short-refcard.pdf> (commands for basic functions)

For Mplus help:

<http://www.statmodel.com/cgi-bin/discus/discus.cgi> (discussion boards)

**Course Overview:**

The purpose of this course is to supplement the PSY 600K graduate core course in Measurement by providing an opportunity for more extensive demonstration and hands-on practice than is possible in a lecture setting.

After completing the course, students will be able to:

* use MS Excel to organize data and perform simple statistical computations .
* demonstrate understanding of classical test theory (CTT) by calculating and interpreting intermediate steps in CTT formulae.
* calculate and interpret classical item analyses in R and Excel.
* perform and interpret reliability calculations in SPSS and R.
* perform and interpret exploratory factor analyses in SPSS and Mplus.
* analyze and compare confirmatory factor models using Mplus.
* obtain and interpret basic IRT parameters using Mplus.

**Performance Opportunities and Grading:**

***Exercises.*** Over the course of the semester, students will complete 13 lab exercises (usually, performing and interpreting calculations relevant to the week’s lecture topic). There are 20 points possible per exercise, and a total of 240 total points possible from exercises across the semester, so missing one exercise will not damage your grade.

Exercises are due on the Monday after they are discussed in lab. Keep in mind that you will not necessarily be able to complete a lab exercise entirely within the time allotted for lab. It is always to your advantage to review each exercise before we discuss it in lab. Exercises should be turned in electronically via Canvas – file formats will vary depending on the exercise.

***Late Assignments:*** Assignments may be turned in late, but a penalty of 10% per 24-hour period late will be assessed **unless** you have made arrangements for an extension **prior** to the original due date. Extensions do require reasonable justification; requests for excessive numbers or lengths of extensions are likely to be denied.

***Course Grades:*** Final course grades will be determined as follows:

|  |  |  |
| --- | --- | --- |
| Points | % | Grade |
| 239+ | 99.5% + | A+ |
| 213.5 – 238.5 | 89.5% -99.4% | A |
| 169.5 – 213 | 79.5% - 89.4% | B |
| 118 – 169 | 69.5 % - 79.4 % | C |

**Schedule of Labs and Exercises**

This schedule is subject to change based on the pace of the class and other considerations. If changes are made, they will be announced in class and posted on Canvas. Always check Canvas for the most recent version of this syllabus.

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Date** | **Topic** | **Exercise Due** |
|  | 1/19 | Introduction; How to Read Mathematical Notation (Exercise 1) | 1/25 |
|  | 1/26 | Getting More out of Excel (Exercise 2) | 2/1 |
|  | 2/2 | Item Writing Practice (Exercise 3) | 2/8 |
|  | 2/9 | Intro to R and Matrix Algebra (Exercise 4) | 2/15 |
|  | 2/16 | Navigating R & Mplus (Exercise 5) | 2/22 |
|  | 2/23 | Reliability (Exercise 6) | 2/29 |
|  | 3/2 | Exploratory Factor Analysis (Exercise 7) | 3/7 |
|  | 3/10 | Issues in EFA (Exercise 8) | 3/21 |
|  | 3/16 | *No Lab - Spring Break* | -- |
|  | 3/23 | Single Factor Confirmatory Factor Analysis (Exercise 9) | 3/28 |
|  | 3/30 | Multiple Factor CFA (Exercise 10) | 4/4 |
|  | 4/6 | Classical Item Analysis (Exercise 11) | 4/11 |
|  | 4/13 | Project Work Day (Reflection) | 4/18 |
|  | 4/20 | *No Lab – SIOP Conference* | 4/25 |
|  | 4/27 | Multiple Groups CFA for Measurement Equivalence (Exercise 12) | -- |
|  | 5/6 | Basic Item Response Theory in Mplus (Exercise 13) | 5/9 |
|  | -- | Finals Week | -- |