**PY222: Stats & Research Methods-II, Spring 2022**

Classes: T/Th (9:30-10:50); Labs: Fri. (9:30-12:20)

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**Welcome!** This course is designed to help you *think* like *a scientist* and to become a critical *consumer* and beginning *producer* of psychological research. You will learn the basic tools to examine existing evidence about psychological topics, how to design and execute your own empirical research, and how to communicate your research to others. While this course aims to provide an exceptional introduction to research, if you have plans to attend graduate school in psychology, you will want to acquire more advanced research experience. Ask me!

**Student Learning Outcomes: By the end of this course, you should be able to…**

* discriminate between research designs and determine what claims each design can and cannot support.
* formulate sound research design decisions for problems based on maximizing and controlling variability.
* design and execute high quality scientific research, including properly analyzing data and accurately interpreting and reporting results.
* write a clear APA-style research paper and deliver a clear research presentation.
* describe and explain basic principles of science and evidential reasoning and how they apply to your everyday life and to the broader world.
* evaluate and critique the evidence presented for claims from an array of sources (e.g., psychology literature, media outlets, friends, etc.) using proper criteria. That is, apply the concepts from class to real life.

**What will we be doing?** We will focus on mastering the terminology and design strategies used in modern psychology. Meetings will emphasize doing, rather than passively listening. Your knowledge from *reading before class* will be the launch-point to work on exercises and to delve deeper into topics so that you can actually learn, not fleetingly memorize.

**How will we know what we know?** Progress toward meeting our learning outcomes will be assessed in several ways. Many exercises have been designed to encourage learning from trying and growing by doing.

## *I. Interteaching (IT).* We will engage in active learning in nearly every meeting, with one common method being through interteaching. Interteaching involves completing PrepGuides (PG) before class, which are questions about the readings. PGs are then used in *discussion* with a classmate for peer-to-peer learning. A record sheet is used to note how well your partner was prepared and to highlight challenging concepts. I will then use that to inform the remainder of the class by focusing on what students found most challenging in the readings. There are 11 PGs/ITs scheduled, but grades are based on only 10, so if you complete and are present for all 11, one is a bonus.

## *II. Quizzes.* We will occasionally give brief quizzes at the very beginning of class (these are in the schedule, so they are not surprises). These cannot be made up under any circumstances and they cannot be taken if you are late to class. These are designed to encourage you to read carefully and to apply your understanding. There are 11 scheduled, but grades are based on only 10, so if you take all 11, one is a bonus.

## *III. Exercise Assignments*. Near the end of coverage of some topics we ask that you complete an exercise/problem set designed to give you experience with particular designs or to help you make progress on your research projects (see IV, below). Many of these are meant to encourage you to apply your knowledge to novel situations, but to do so in a way where you can still make some mistakes and learn from them without substantial penalty.

## *IV. Exams.* There will be two exams: a mid-term and a final. Both will be take-home, open book and notes (but no collaboration with others or use of the internet at all). I will provide them about one week in advance of their due date, but to complete them, you will need to study ahead of time. You will not be able to start from “ground zero” and complete them on time. I typically include “bonus” questions/points on exams.

**LAB.** The best way to learn science is to *do real science* and so we shall. Labs will focus on practicing research skills, working on projects and papers, and on how to write APA-style papers.

## *V. Research Projects and Papers:* We will devise and conduct two original research projects during the term – one correlational and one experimental and write APA-style papers for both. The first project (a correlational design) will be one the entire class decides on and designs. It will involve a short, individually written APA-style paper). The second project (an experimental design) will be conducted in small groups, wherein you will read an article and design a nearly exact replication, but will slightly tweak something in the design (e.g. add a new variable, manipulate the IV differently, measure the DV differently, etc.). Projects will involve many small steps, including instruction on writing, ample design and data analysis practice, and drafts with feedback. All writing and analysis work is to be completed individually.

**Materials:** (1) Heath, W. (2018). *Psychology Research Methods, (1st ed.).* (2) Kail, R.V. (2018). *Scientific Writing for Psychology, (2nd ed.).* (3) Lab Manual For PY-222 (provided); (4) *APA Manual,* (7/e). (Optional); (5) Other readings in the schedule are available on Moodle.

**PPT Slides:** I will post slides before classes/labs no later than 5:00 p.m. the day before the meeting. If not, I will bring copies with me to hand out. The slides I provide will NOT contain everything that appears on the ones I present in class because there is great learning value in you actually writing things down. The slides I provide are there merely to serve as an outline – not to be taken as complete notes. That’s your job.

**Classroom Professionalism, Etiquette, and Policies**

* Julie and I will be delighted to meet with you! E-mail us to set up a convenient time for virtual meetings.
* The College health and safety policy is that everyone wear a mask *properly* the *entire time* when inside any academic building. I will enforce this policy carefully and fully. I will make you leave the room if you fail to adhere to BSC’s safety protocols and you cannot make up any missed work in this case. If you’ve an issue with this, take it up with those who set the policy, namely the College President.
* PLEASE, no cell phones anywhere out unless I ask you to use them. I can 100% see you using them under your desk, every time. You may not know this yet, but it is considered highly unprofessional to look at or use your phone here and in the workplace. Also, I admit, it also annoys me terribly. I find it incredibly rude.
* No laptops open or on your desk, unless otherwise directed. Academic accommodation is the only exception.
* Attendance: It is very easy to fall behind in this course. We do lots of hands-on work in classes and the material builds on itself. Furthermore, you cannot make up work for absences (see late policy below). The policy: Miss more than 6 classes/labs combined (that’s two full weeks of classes) = 10% deduction on final grade. 10% further reduction per two missed thereafter. If you must miss that many classes, I highly recommend dropping the course. Your wellbeing is far more important than any class or term in College. Lastly, two lates = one absence.
* Late work: 50% off for on-time PGs if you are not present for IT or for engaging in an IT session without completing the PG. 20% per day for late exercises. No other late work accepted, at all, no exceptions. Requests for extensions for written work due to *documented* academic accommodations must be submitted in writing no less than one week prior to due dates. *No extensions for exams or paper drafts will be granted* *– no exceptions.* The due dates are listed well in advance.
* Abide by the [BSC Honor Code](https://www.bsc.edu/campus/studev/honor-council/index.html). Plagiarism, cheating, and lying will not be tolerated. Recall, it is also your responsibility to report any suspected violation of the Honor Code, lest you are also committing a violation.
* Take good notes. Check out the Cornell method [here](https://www.youtube.com/watch?v=HJCnqj7j7rU). I used it to great effect in college and grad school.
* Academic Accommodations. I am happy to support any *documented, reasonable* accommodations.
* Anything in this syllabus is subject to change at any time. It is difficult to predict the pace of real research, so that sometimes necessitates changes. Likewise, I will not press forward in covering new material if I get the sense that most of the class is not ready. Plus, zombie attacks may require minor alterations to the schedule, especially if they render us brainless. You will be notified of changes.

Note on statistics pre-requisite: We will assume a basic understanding of statistics from your successful completion of this course *pre-requisite* (PY221, formerly PY204). While you will not be asked to engage in many computations, we will presume you’ve retained a basic understanding of various concepts and statistical tests from PY221, and that you are familiar with statistics software (Jamovi).

Note on course workload. Yes, I realize this course is a lot of work, perhaps more than many other courses. One reason for this is that research methods is widely considered the backbone of a Psychology degree and as such, the discipline itself and your other BSC PY faculty make many demands for what you should learn in this course. It is not uncommon to hear or read on evaluations something like, “This class is more work than any two of my other classes!” The implication is that I have made the course too much work. However, the underlying reasoning of the previous comment is quite misguided *because it IS two courses!* The class meets 3 hours per week (1 whole class) and the lab meets 3 hours per week (another whole class). You may lament that you only get 1 unit of credit for the course. True, but that’s not my decision–the College has made that decision. The College dictates that while a lab-course only counts for 1 unit for students, it must meet the workload requirements of 2 courses to justify having the lab at all. In short, I empathize with the concern about the workload, but please remember that there is very little I can do about it. Those decisions are made above my pay grade. Take it up with the Provost.

**Grades:** 610 total points. PG/ITs (10 of 11 @ 6 pts. each = 60), Quizzes (10 of 11 @ 3 pts. each = 30); Exercises (5, @ 15 pts. = 75); Mid-Term and Final Exams (2 @ 100 = 200); Article Notes (8 @ 1.25 = 10); Paper 1 Draft (20); Final Paper 1 (75); Paper 2 Draft-1 (15); Paper 2 Draft-2 (25); Final Paper 2 (100). About 27% of the points come from “preparation,” about 33% from exams, and about 40% from papers. Please keep track of your own grades. The standard BSC +/- system will be used for final grades. I typically do *not* round averages (e.g., 89.9% is a B+), *but attendance, timeliness, professional behavior, and level of engagement may result in exceptions to that policy.*

*Note:* Failure to turn in the plagiarism assignment will result in zeros on all papers. Failure to turn in drafts on time will result in a zero on the draft and the point value of that draft(s) deducted from the final paper grade. We will not grade any parts of Paper 2 unless the Protocol assignment (Exercise #5A and B) is completed on time. Similarly, you must visit the Writing Center prior to the submission of ALL paper drafts or we will not grade the drafts or the final papers – they will be zeros. The Writing Center will e-mail me the name of visitors and the date they visited and what was discussed.

**The Most Effective Learning Techniques. Study Smarter, Not Longer.** Many of the learning techniques students use are ineffective and inefficient (e.g., re-reading, highlighting, studying one topic for long periods, etc.).

Based on decades of high quality scientific research, the two most effective methods known to date are:

* **Spaced practice / distributed practice** – learning that occurs over multiple sessions at different points in time (for example, revisiting a textbook chapter once every three days). This technique refers to *when* you should be preparing for course exams (that is, multiple sessions spread out over several weeks).
* **Retrieval practice / practice testing** – instead of simply restudying information, attempting to recall that information from memory (such as by taking a practice test). This technique refers to *what* you should be doing to prepare for course exams (that is, test yourself via practice tests or other recall-based techniques).

**Spaced practice involves *when* you should “study” and retrieval practice involves *how* you should “study”.** When you use both (for instance, you can prepare for your exams using a spaced practice schedule and then use retrieval practice during each session), they make a powerful combination. Additionally, if you perform retrieval practice across multiple days – and, each time, practice recalling information until you attain 100% accuracy (a method called *successive relearning*) – then recent research shows that your ability to retain that information over long periods of time is maximized.

Finally, besides spaced and retrieval practice, there are some additional learning techniques that you may wish to try. These included ***interleaved practice, self-explanation, and others***.

► Further information and more strategies: [Learning Scientists – 6 most empirically-validated methods of learning](https://www.learningscientists.org/blog/2019/11/28-1)

*Unless otherwise noted, all work is due by 9:00 a.m. on the due date listed in the schedule. (end) means due at the end of the period.*

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| **Week** | **Date** | **Day** |  | **Class/Lab Plan** | **Readings** |
| Week 1 | 1-Feb | TU | Topics | 1) Introductions and overview of PY 222 | Syllabus |
| Due | --- |
| 3-Feb | TH | Topics | 1) Overview of Research Methodology | Heath Ch. 1 |
| Due | 1) PG/IT-1 |
| 4-Feb | FR | *Lab-1* | 1) Quiz #1  1) Information Literacy: How to read journal articles; Writing notes; Searching the primary literature (PsycINFO)  2) APA-Style basics: Formatting and citations | 01.Journal Articles;  Heath Ch. 2 (42-50);  02.Article Notes;  03.APA-Style Citations |
| Due | 1) Practice APA-style exercise and Article note (end) |
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| Week 2 | 8-Feb | TU | Topics | 1) Correlational Research | Heath Ch. 6 |
| Due | 1) PG/IT-2 |
| 10-Feb | TH | Topics | 1) Project 1: Correlational Research Design | Research articles for Project 1 |
| Due | 1) Article Notes 1-3 for Project 1 |
| 11-Feb | FR | *Lab-2* | 1) Quiz #2  2) Correlational Research (Multivariate)  3) Stats/Jamovi Refresher (creating new vars.; Pearson r; Cronbach’s, etc.), w/ focus on correlational data | Heath Ch. 6 (145-155)  Multiple Regression Jamovi videos |
| Due | 1) Hypothesis for Project #1 (end)  \*2) Exercise #1: Correlational Research due by Sun., 2/13 noon |
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| Week 3 | 15-Feb | TU | Topics | 1) Quiz #3  2) Defining & Measuring Psychological Variables | Heath Ch. 4 |
| Due | --- |
| 17-Feb | TH | Topics | 1) APA-Style: Writing-1: Paragraphs, Introduction, Method, and Results Sections | Kail Ch. 4-6  Relevant sections in Writing Manual  Heath Ch. 14 (337-352) |
| Due | 1) PG/IT-3 |
| 18-Feb | FR | *Lab-3* | 1) Data Analysis for Project 1 (You will analyze the data on your own and bring it to lab. We will go over it together.)  2) Writing Workshop/Reminders; Writing Paper 1 (if time) | Kail Ch. 7 |
| Due | 1) Exercise #2: Complete analysis w/interpretation (end)  2) *\*Plagiarism Certificate due by Sun, 2/20 noon\**  *\*Visit the Writing Center before turning in paper 1 draft\** |
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| Week 4 | 22-Feb | TU | Topics | 1) Experimentation with 1 IV | Heath Ch. 8 (183-200) |
| Due | 1) PG/IT-4  **\*2) Polished Draft of Paper 1 (due by midnight)** |
| 24-Feb | TH | Topics | 1) Quiz #4  2) Experiments with 1 IV: Variability, Analysis | Variability  Heath Ch. 8 (200-208)  Exemplar Article #2 |
| Due | 1) Sample experiment results and output (optional) |
| 25-Feb | FR | *Lab-4* | 1) Experiments with 1 IV wrap-up | Jamovi Videos  Review Ch. 8 |
| Due | 1) Exercise #3: Experiments (end)  2) **\*Project 1 Final Paper due by Sun 2/27, noon\*** |
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| **Week** | **Date** | **Day** |  | **Class/Lab Plan** | **Readings** |
| Week 5 | 1-Mar | TU | Topics | 1) Factorial Experiments: The FUNdamentals | Heath Ch. 9 (211-230) |
| Due | 1) PG/IT-5 |
| 3-Mar | TH | Topics | 1) Factorial Experiments: More Practice | Heath Ch. 9 (230-239)  Jamovi videos |
| Due | 1) Practice Factorial Design Results Interpretations (end) |
| 4-Mar | FR | *Lab-5* | 1) Working with Factorial Designs: More Practice Still  \*2) Work on Exercise #4: Factorial Designs – *due anytime before 3/18, noon* | Exemplar Article #3  Ch. 9 (review) |
| Due | **\*Mid-Term Exam (through 2/25) due by Sun. 3/6, noon\*** |
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| Week 6 | 8-Mar | TU | Topics | 1) Quiz #5 (over the project document and two articles)  2) Project 2: Experimental Design Conceptual Replication  3) Reading Research for Project 2; Idea Generation | Project 2 Document  2 Research Articles  Heath Ch. 2 (31-42) |
| Due | 1) Choices for Replication Study (end) |
| 10-Mar | TH | Topics | 1) Project 2: Idea, Protocol, Materials work | Project 2 Research Articles  Protocol Assignment |
| Due | 1) Article Notes 1-3 for Project 2  2) Exercise #5A: Draft Protocol with literature support (end) |
| 11-Mar | FR | *Lab-6* | 1) Project 2: Final Wrap-up: Protocol, Materials  2) APA-Style Writing: Discussions and Matters of Style | Kail Ch. 7  Heath Ch. 14 (353-357)  Writing Manual |
| Due | 1) Article Notes 4-5 for Project 2  2) Exercise #5B: Finalized Proposal/Protocol  *\*Data collection begins no later than 3/14; continue to 4/4* |
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| Week 7 | 15-Mar | TU | Topics | 1) Quasi-Experiments and Small-N Designs | Heath Ch. 10 |
| Due | 1) PG/IT-6 |
| 17-Mar | TH | Topics | 1) Quiz #6  2) Quasi-Experiments and Small-N Designs | Morling  Heath Ch. 10 |
| Due | --- |
| 18-Mar | FR | *Lab-7* | 1) Ethics in Research | Heath Ch. 3 |
| Due | 1) PG/IT-7  2) Recall, Exercise #4: Factorial Designs due by today, noon |
| *Spring Break: 3/19-3/27* | | | | | |
| Week 8 | 29-Mar | TU | Topics | 1) Factorial Designs & Quasi-Experiments Refresher | Heath Chs. 9-10 (review) |
| Due | --- |
| 31-Mar | TH | Topics | 1) Quiz #7  2) Descriptive Research Methods | Heath Ch. 5 |
| Due | --- |
| 1-Apr | FR | *Lab-8* | 1) Survey Research / Catch-up | Heath Ch. 7 |
| Due | 1) PG/IT-8 |
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| Week 9 | 5-Apr | TU | Topics | 1) Quiz #8  2) External Validity / Generalizability | Heath Ch. 12 (283-296) |
| Due | --- |
| 7-Apr | TH | Topics | 1) Replication | Heath Ch. 12 (283-296) |
| Due | --- |
| 8-Apr | FR | *Lab-9* | 1) Writing day on your own – no lab |  |
| Due | **---** |
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| **Week** | **Date** | **Day** |  | **Class/Lab Plan** | **Readings** |

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| Week 10 | 12-Apr | TU | Topics | 1) Project 2 Data Analysis | Kail Ch. 6  \*Review Jamovi videos for your analyses |
| Due | --- |
| 14-Apr | TH | Topics | 2) Project 2 Data Analysis (continued) | \*Review Jamovi videos for your analyses |
| Due | **---** |
| 15-Apr | FR | *Lab-10* | *No lab – School closed* | Heath Ch. 14 (348-352) |
| Due | **1) Polished Draft of Results for Project 2** *(due Monday 4/18 by 9:00 a.m.)* |
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| Week 11 | 19-Apr | TU | Topics | 1) Why do we need a science of human behavior anyway? | Stokes (2012)  Kida Ch. 9 |
| Due | 1) PG/IT-9 |
| 21-Apr | TH | Topics | *No class for 222 – We are away at MPA research conference* |  |
| Due | --- |
| 22-Apr | FR | *Lab-11* | 1) Paper-2 Writing (*on your own*). We are at MPA. |  |
| Due | **1) Polished Draft of Intro, Method, & Discussion for Project 2 (due by midnight Sunday 4/24)** |
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| Week 12 | 26-Apr | TU | Topics | 1) Quizzes #9 & #10 combined  2) What Is Science and What Makes It So Special? | Lack & Rousseau Ch. 2 |
| Due | --- |
| 28-Apr | TH | Topics | 1) How to Think Straight about Science Pretenders (i.e., Pseudoscience) | Lack & Rousseau Ch. 3 |
| Due | 1) PG/IT-9 |
| 29-Apr | FR | *Lab-12* | 1) Catch-up  2) Quiz #10 (on factorials and Q-E designs)  3) Factorial Review, Quasi-Expt. Review | Review Heath Ch. 10, 9 & Class Notes |
| Due | 1) PG/IT-10 |
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| Week 13 | 3-May | TU | Topics | 1) Using Your Methods Skills for Consuming Research  2) Issues of the Day: Fake News and Science Denial | Witze (2021)  Novella Ch. 23 |
| Due | 1) PG/IT-11 |
| 5-May | TH | Topics | *Honors Day – No classes* |  |
| Due | **1) Final paper 2 due by noon** |
| 6-May | FR | *Lab-13* | 1) Quiz#11  2) Review, Practice, Review, Practice |  |
| Due | --- |
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| Week 14 – Finals | 13-May | FR | Due | **Final Exam due by noon**  \*You are now officially a first-degree research methods ninja. Use your hard-earned skilz wisely. May peace, the Force, and ultimate control of variability be with you. |  |