

# Research Methods

APK 4050 | Class # 10284 | 3 Credits | Summer A 2023

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## Course Info

### INSTRUCTOR

**James Cauraugh, Ph.D.**  
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Preferred Method of Contact: Email

### OFFICE HOURS

Virtual by appointment. Send an email to request a time to Zoom.

### MEETING TIME/LOCATION

**Monday – Friday: 3:30 – 4:45 PM; CSE E220**  
**This a physical presence class in Summer A**

Access course syllabus, journal guidelines, and unofficial grades via Canvas on UF e-Learning (<https://elearning.ufl.edu/>) & the Canvas mobile app by Instructure

## COURSE DESCRIPTION

Research methods (RM) provides an understanding of basic concepts and techniques used in applied physiology and kinesiology. Students will demonstrate their knowledge of the course materials by analyzing, interpreting, and summarizing research, writing for professional journals, and by planning/evaluating research studies.

## PREREQUISITE KNOWLEDGE AND SKILLS

APK major with 3, 4, 6, or 7 classifications

## REQUIRED AND RECOMMENDED MATERIALS

1. **Strunk, W., & White, E. B.** (2000). *The elements of style* (4th ed.). New York: Macmillan (eBook).
2. **Cauraugh, J. H.** (2020). *Research Methods: Functional Skills – Third Edition*. ISBN: 978-1-939337-34-4 (eBook).

## COURSE FORMAT

Physical presence lectures encourage interactions and active learning. This process involves students answering questions, solving problems, and discussing science topics. Prepared students read the required *Research Methods eBook* and combine the information with their APK areas of interest. Expect to be asked questions Mondays and Wednesdays.

## COURSE LEARNING OBJECTIVES:

1. *Identify and apply the steps involved in the scientific method*
2. *Critique research articles and determine the quality of publications*
3. *Evaluate experimental designs and choose appropriate statistics to analyze data*
4. *Visually and verbally present experimental designs, data, and findings*
5. *Formulate a research question, generate a research hypothesis, and design a study*
6. *Identify issues related to methodology and discuss guidelines to improve scientific rigor and reproducibility*
7. *Discuss issues related to research ethics and responsible conduct of human and animal research*
8. *Outline the processes related to manuscript reviews, writing, authorship, and journal impact*
9. *Conduct a literature search and manage references*

## Course & University Policies

### ATTENDANCE POLICY

Class attendance is expected, however, not required. Why should you attend lectures? To practice answering questions on specific Research Methods (RM) concepts and earn one point. Students who actively learn typically excel in RM.

### PERSONAL CONDUCT POLICY

UF students are bound by **The Honor Pledge**, which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at UF, the following pledge is either required or implied: **“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”**”

The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Further, you are obliged to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, then please consult with your professor.

### EXAM MAKE-UP POLICY

A student experiencing an illness should visit the UF Student Health Care Center or their preferred healthcare provider to seek medical advice and obtain documentation. If you have an illness, family emergency or death, please contact the Dean of Students Office ([www.dso.ufl.edu](http://www.dso.ufl.edu)) and follow the DSO Care Team procedures for documentation and submission of a request for make-up assignment (<https://care.dso.ufl.edu/instructor-notifications/>). The DSO will contact the instructor. Do not provide any documentation to the instructor regarding illness or family emergency. This is your personal and protected information. The DSO is qualified to receive and verify the documents you provide. The instructor will follow the recommendations from the DSO. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.”

### ACCOMMODATING STUDENTS WITH DISABILITIES

Students with disabilities who experience learning barriers may request academic accommodations. Contact the Disability Resource Center by visiting their Get Started page at <https://disability.ufl.edu/students/get-started/>. Early in the semester, share your accommodation letter and discuss access needs with your professor.

## COURSE EVALUATIONS

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

## Getting Help

### HEALTH & WELLNESS

- U Matter, We Care: If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) or 352 392-1575
- Counseling and Wellness Center: <https://counseling.ufl.edu/>, 352-392-1575
- Sexual Assault Recovery Services (SARS) - Student Health Care Center, 392-1161
- University Police Department, 392-1111 (or 9-1-1 for emergencies) <http://www.police.ufl.edu/>

### ACADEMIC RESOURCES

- E-learning technical support, 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu). <https://lss.at.ufl.edu/help.shtml>
- Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling. <https://career.ufl.edu/>
- Library Support, <http://cms.uflib.ufl.edu/ask>. There are several ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <http://teachingcenter.ufl.edu/>
- Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and drafting papers. <http://writing.ufl.edu/writing-studio/>
- Student Complaints On-Campus: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/> On-Line Students Complaints: <http://distance.ufl.edu/student-complaint-process/>

### INCLUSION, DIVERSITY, EQUITY, AND ACCESSIBILITY RESOURCES

For suggestions or concerns related to IDEA, please reach out to any of the following:

- Dr. Linda Nguyen, APK IDEA Liaison, [linda.nguyen@hhp.ufl.edu](mailto:linda.nguyen@hhp.ufl.edu)
- Dr. Rachael Seidler, APK Graduate Coordinator, [rachaelseidler@ufl.edu](mailto:rachaelseidler@ufl.edu)
- Dr. Joslyn Ahlgren, APK Undergraduate Coordinator, [jahlgren@ufl.edu](mailto:jahlgren@ufl.edu)

## Grading

In previous classes, students who accurately answered questions during lectures, completed the science journal entries, and scored well on each of the three exams earned points to excel.

UF's catalog provides detailed information regarding current UF grading policies:

<https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>. Any requests for additional extra credit or special exceptions to these grading policies may be interpreted as an honor code violation (i.e., asking for preferential treatment) and will be managed accordingly.

**Format on exams: combination of multiple-choice questions, definitions, short essays, long essays, calculations, and interpreting findings.**

<i>Evaluation Component</i>	<i>Points Per Component</i>	<i>Percentage of Total Grade</i>
Exam 1: Thursday, May 25	32	32%
Exam 2: Thursday, June 8	32	32%
Exam 3: Thursday, June 22	32	32%
Science Journal & Class Participation	4	4%
Total	100	100%

## GRADING SCALE

After taking Exams 1 and 2, on the following class period, you will see your performance when we go over the exams in the next class. Given that you will only write your GatorID on the exams, the two following Mondays allow you to claim your exam and sign your name. Even though exam percentages are posted on Canvas, grades are officially calculated in an Excel file on my computer. An Excel printout is always available after the exams.

Letter Grade	Total Points Required to Earn Each Letter Grade
A	≥ 91
A-	89
B+	88
B	81
B-	79
C+	78
C	71
C-	69
D+	68
D	61
D-	59
E	≤58

## Weekly Course Schedule:

### CRITICAL DATES & UF OBSERVED HOLIDAYS

- Memorial Day, Monday, May 29, 2023

### WEEKLY SCHEDULE

Lecture	<i>Research Methods: Functional Skills (3<sup>rd</sup> edition)</i>	Content
	Chapter & Heading	
1	<b>Syllabus &amp; Preface</b>	Overview; An approach to Science; Importance of RM & Science
2	<b>Chapter I: 1.1 – 1.5</b>	Causal Relationships; Types of Research; Two Supreme Problem Solvers

3	1.6 – 1.11	Science, Exp. Design, Variability, & Statistics
4	<b>Chapter II: 2.1 – 2.5</b>	IVs: Main Effects, & Interactions Voluntary Motor Actions: ME & Interactions
5	2.6 – 2.9	MEs & Interactions: Matrix Visually Displaying Two-way Interactions Two Frequently Used Statistics: <i>t</i> & <i>F</i> tests
6	<b>Chapter III: 3.1 – 3.4</b>	Designs Vary by Three Criteria Different Designs: One-way & Two-way
7	3.5 – 3.8	Designs: Between-subjects, Within-subjects, & Mixed Review
<b>May 25</b>	<b>Exam 1: 32 points</b>	<b>eBook Chapters: Preface, I, II, &amp; III Strunk &amp; White (first half)</b>
1 & 2	<b>Chapter IV: 4.1 – 4.7</b>	Statistical Significance & Reminders One-tailed & Two-tailed Tests Multiple Comparison Procedures Null & Alternative Hypotheses <i>F</i> Table Critical Values Truth Table & Power
3 & 4	<b>Chapter V: 5.1 – 5.7</b>	Internal and External Validity Eight Internal and Four External Threats Three Internally Valid True Experiments Three Pre-experimental Designs
5 & 6	<b>Chapter VI: 6.1 – 6.10</b>	Parametric & Nonparametric Statistics ANOVA Assumptions & Summary Table Chi-Square, Correlations, <i>t</i> & <i>F</i> Tests Hick-Hyman Law
<b>June 8</b>	<b>Exam 2: 32 points</b>	<b>eBook Chapters IV, V &amp; VI Strunk &amp; White (second half)</b>
1 & 2	<b>Chapter VII: 7.1 – 7.9</b>	Research Integrity & Oath for Scientists Ethics in Life & Science Institutional Review Board Protecting Rights of Individuals
3 & 4	<b>Chapter VIII: 8.1 – 8.12</b>	Writing: Clear, Concise, & Correct Four Evaluation Criteria & Questions to Ask Increase the Quality of Our English Language

5 & 6	Chapter IX: 9.1 – 9.7	Analysis of Covariance, Meta-Analysis, & Regression Analyses Multivariate Statistics & Saving Trees
7	Chapter X	Three Clinical Research Steps
June 22	Exam 3: 32 points	eBook Chapters VII, VIII, IX, & X Review Previous Chapters

### SUCCESS: A MOTIVATIONAL PERSPECTIVE

Your RM experiences will be meaningful given that you actively use the information in the eBook (*Research Methods: Functional Skills, 2020; Third Edition*) as well as the information presented and discussed in lectures. Enjoy this exposure to the scientific arena. The teaching style of this course is primarily reciprocal interaction with frequent, relevant questions used to practice retrieval of concepts. You must be able to use this knowledge in different situations. Our frequent research interactions will be more enjoyable if you relax and expect that I will ask you at least one question every class. In this flipped classroom, you should read the eBook chapters before class and be prepared to speak about scientific concepts while supporting your statements with logical thinking and empirical evidence. Student answers and questions are encouraged at any time during our interactions. Importantly, the information for this course is readily learned when students give sincere efforts and embrace the topics. **Be a student who attains her or his intellectual potential!**

### Required Textbooks: Two e-Books

1. Strunk, W., & White, E. B. (2000). *The elements of style* (4th ed.). New York: Macmillan (eBook).
2. Cauraugh, J. H. (2020). *Research Methods: Functional Skills – Third Edition*. (eBook).

**The two eBooks are at three electronic sources. Cut and paste a source into your browser.**

1. **Smashwords:** <http://www.smashwords.com/books/search?query=cauraugh>
  - a. [Download a free Kindle app to your laptop computer, iPad, or iPhone.](#)
  - b. [Download a version to read on your Kindle app.](#)
  - c. [Marking and searching the text will be easy on the Kindle app.](#)
  - d. When you buy the book on Smashwords, be sure to get the iBook version. **Download the 'epub' file, then you will be able access and read in iBooks. Click epub (inside the red circle) as shown in the following screen shot.**



## Research Methods: Functional Skills - 3rd Edition

By James Cauraugh

**\$48.00**

**Category:** Essay » Author profile, Nonfiction »  
Science & Nature » Reference

**Published:** Dec 30, 2012

**Words:** 40,724

**Language:** American English

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**2. Apple iBooks;** For Apple iPad/iPhone/iPod Touch, download the free Apple iBooks app and buy the eBooks on your iTunes account.

<https://books.apple.com/us/book/research-methods-functional-skills-3rd-edition/id1278898939>

**3. Amazon – Kindle or Kindle Fire app reading:**

<http://www.amazon.com/dp/B00AUZPSSY>



**Research Methods: APK 4050, class # 10284**  
**Science Journals: Watching, Reading, Thinking, and Writing**  
**Summer A 2023, Friday Schedule: TED Talks and PubMed Search**

- Lectures are given Monday through Thursday
- On Fridays you will complete an individual active learning day (no lecture)
- **Six learning activities are scheduled for Summer A**
- Use your new RM knowledge while **Watching, Reading, Thinking, and Writing**
- Writing and thinking about science and RM outside of the classroom is highly productive to learning

Every Friday your task is to create one science journal file on the six topics listed below. Before the second exam, you will send your file with your journal entries 1 – 3 to a classmate to read and complete a cursory review. At the same time, you will read a set of three journal entries written by a classmate. The evaluation criteria are writing style and organization. To earn the full three points, you must complete three phases: (a) do journals 1 – 3, save in one file, and send them to a classmate for review, while you review her/his entries, (b) do journal entries 4 – 6, and (c) upload your science journal file with **six** entries at Assignments in Canvas by Friday, **June 16, 2023**.

1. Summarize a TED Talk (Ideas Worth Spreading)
  - a. Angela Lee Duckworth: **Grit: The power of passion and perseverance**  
[https://www.ted.com/talks/angela\\_lee\\_duckworth\\_grit\\_the\\_power\\_of\\_passion\\_and\\_perseverance?referrer=playlist-the\\_most\\_popular\\_ted\\_talks\\_of\\_all\\_time&autoplay=true](https://www.ted.com/talks/angela_lee_duckworth_grit_the_power_of_passion_and_perseverance?referrer=playlist-the_most_popular_ted_talks_of_all_time&autoplay=true)
2. Summarize a TED Talk
  - a. Shawn Achor: **The happy secret to better work**  
[http://www.ted.com/playlists/171/the\\_most\\_popular\\_talks\\_of\\_all](http://www.ted.com/playlists/171/the_most_popular_talks_of_all)
3. Summarize a TED Talk
  - a. Jim VandeHei: **How to write less but say more**  
[https://www.ted.com/talks/jim\\_vandehei\\_how\\_to\\_write\\_less\\_but\\_say\\_more](https://www.ted.com/talks/jim_vandehei_how_to_write_less_but_say_more)
4. Summarize a TED Talk
  - a. Daniel Pink: **The puzzle of motivation**  
[https://www.ted.com/talks/dan\\_pink\\_the\\_puzzle\\_of\\_motivation?referrer=playlist-the\\_most\\_popular\\_ted\\_talks\\_of\\_all\\_time&autoplay=true](https://www.ted.com/talks/dan_pink_the_puzzle_of_motivation?referrer=playlist-the_most_popular_ted_talks_of_all_time&autoplay=true)
5. Summarize a TED Talk
  - a. Robert Waldinger: **What makes a good life? Lessons from the longest study on happiness**  
[https://www.ted.com/talks/robert\\_waldinger\\_what\\_makes\\_a\\_good\\_life\\_lessons\\_from\\_the\\_longest\\_study\\_on\\_happiness?referrer=playlist-the\\_most\\_popular\\_ted\\_talks\\_of\\_all\\_time&autoplay=true](https://www.ted.com/talks/robert_waldinger_what_makes_a_good_life_lessons_from_the_longest_study_on_happiness?referrer=playlist-the_most_popular_ted_talks_of_all_time&autoplay=true)
6. Plan a study
  - a. Search PubMed for an interesting topic and read an article or two
  - b. What is your idea for a study?
  - c. Plan a study that will contribute to the literature
  - d. What is the purpose of your study?



- e.** How is your purpose different from the literature?
- f.** Generate a research hypothesis
- g.** What is your experimental design?

- A typical journal entry is three paragraphs. In the first paragraph summarize the TED Talk, video, or article in your own words. Paragraph two contains your primary questions/thoughts that were generated and a brief discussion. The third paragraph provides answers to some of the questions you asked in paragraph two.

- Here is an example of a paragraph two written after watching a teenager driving a standard shift car:

How do we initiate, control, and terminate movements? Various movements such as walking, riding a bike, driving a car, writing, and exercising seem automatic with no apparent thought going into the exact sequence of movements before or during execution. When driving a car, I automatically push the clutch down, release the brake, turn on the ignition, and release the clutch. Seldom do I stall at traffic lights or fail to push the clutch in at the right time. Yes, today's cars are easier to drive than the stick shift I first drove on a back road. The required movements and the car's response appear natural now. How did I reach an automatic phase of learning with the clutch and gas? How do motor control and neuroscience researchers investigate these types of learning and control questions?