

## RESEARCH METHODS

**APK 4050: 10332 ~ 3 CREDITS ~ SUMMER 2020**

**INSTRUCTOR:** James Cauraugh, Ph.D.  
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**VIRTUAL OFFICE HOURS:** Tuesday and Wednesday 5:00 – 6:00 PM; Zoom

**MEETING TIME:** Monday – Thursday, 6<sup>th</sup> period (3:30 – 4:40 PM)

**LIVE ZOOM LECTURES WILL BE GIVEN MONDAY THROUGH THURSDAY AT 3:30 PM**

**COURSE DESCRIPTION:** The course provides an understanding of basic research methods and statistical analysis techniques used in applied physiology and kinesiology. Students will demonstrate their knowledge of the course materials by analyzing, interpreting and summarizing research writing in professional journals, and by planning a research study.

**PREREQUISITE KNOWLEDGE AND SKILLS:** APK major with 3, 4, 6 or 7 classification

**REQUIRED TEXT BOOKS: TWO E-BOOKS**

1. Strunk, W., & White, E. B. (2000). *The elements of style* (4th ed.). New York: Macmillan (eBook).
2. Cauraugh, J. H. (2017). *Research Methods: Functional Skills – Second Edition*. ISBN: 978-1-939337-34-4 (eBook).

**COURSE FORMAT:** Zoom lectures will 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 integrate the information into their interests in APK. Expect to be asked at least one question a day. Fridays are individual learning days and journal tasks.

**COURSE LEARNING OBJECTIVES:** By the end of this course, students should be able to:

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 to address the question
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 factors
9. Conduct a literature search and manage references

## COURSE AND UNIVERSITY POLICIES:

**ATTENDANCE POLICY:** Class attendance to the **Live Zoom Lectures** is expected. Even though no points are earned for attending class, students who are able to answer questions on specific concepts discussed in lectures do well in this course.

**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.

Students in Research Methods will exhibit behaviors that reflect highly upon themselves and our University. Furthermore, you are obliged to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult the professor in this class.

**EXAM MAKE-UP POLICY:** Students will take three examinations on the scheduled dates with Honor Lock active. If an emergency arises on an exam date, then a make-up exam must be scheduled as soon as possible. Requirements for 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 requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the professor when requesting accommodation. You must submit this documentation before taking exams. Accommodations are not retroactive; therefore, students should contact the office early in the semester. Arrangements will be made for taking exams in consultation with the professor.

**COURSE EVALUATION:** Students providing feedback on the quality of instruction is important. Please complete a course evaluation online near the end of the semester at <https://ufl.bluera.com/ufl/>

## GETTING HELP:

### *Health and 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>. Various 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 writing 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/>

### *Informational Items*

1. Official UF holiday; no classes or exams:
  - a. Martin Luther King Jr. Day, Monday, January 20, 2020

- b. Spring Break, March 2 – 6, 2020
- c. Reading Days, Thursday and Friday, April 23 & 24: no Final Exams or papers due

## GRADING:

	<u>Points</u>
Science Journals (12 entries)	4
<i>Exam 1: May 21, Thursday</i>	32
<i>Exam 2: June 4, Thursday</i>	32
<i>Exam 3: June 18, Thursday</i>	32
	—
<b>Total</b>	<b>100</b>

Before each exam, we will discuss the exact format.

## GRADING SCALE:

Letter Grade	Total Points Required to Earn Each Letter Grade
A	≥ 93
A-	90
B+	89
B	83
B-	80
C+	79
C	73
C-	70
D+	69
D	63
D-	60
E	≤59

Please note that no extra credit is available for this course. Previous students who submitted 12 science journal entries and scored well on the four exams accumulated enough points to excel.

UF's catalog provides detailed information regarding current UF grading policies: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>. Requests for exceptions to these grading policies may be interpreted as an honor code violation and will be addressed accordingly.

## WEEKLY COURSE SCHEDULE: READING SCHEDULE AND CONTENT

Exam questions are based on the two eBooks: *Research Methods: Functional Skills* (2<sup>nd</sup> ed.) and *The Elements of Style*. Thus, no PowerPoint slides are posted for the course.

*Note: the content for any exam may change depending on class interactions and apparent course progress.*

Strunk, W., & White, E. B. (2000). *The elements of style* (4th ed.). New York: Macmillan (eBook). Read the whole book for writing questions on the first two exams.

See the Science Journal file: specific tasks required for the weekly Journal Entries (1 – 10).

<b>Week</b>	<b><i>Research Methods: Functional Skills (2<sup>nd</sup> ed.); Chapter</i></b>	<b><i>Content</i></b>
1	Syllabus & Preface	Course Overview & Causal Research Effects
	<b>Chapter I.</b> Introduction	Science, Experimental Design, Variability, & Statistics
	<b>Chapter II.</b> Experimental Design	Independent Variables, Main Effects, & Interactions
		Independent Variables, Main Effects, & Interactions
2	<b>Chap. III.</b> Exper. Design: Criteria & Five Designs	Designs Vary by Three Criteria; Exper. Designs & Statistical Analyses
		Visually Displaying Two-way Interactions
		Confirmation of Main Effects & Interactions: Matrix & Figure
		Review
	<b><i>Exam 1: 32 points</i></b>	<b><i>Chapters I - III</i></b>
3	<b>Chapter IV.</b> Hypothesis Testing & Statistical Significance	Statistical Significance, One-tailed & Two-tailed Tests
	<b>Chapter V.</b> Sections 5.1 – 5.7	Null & Alternative Hypotheses; Truth Table

		Pearson Product Moment Correlation & Exchange Journals
		F test (F ratio), F Table Critical Values, & ANOVA Summary
4	Chapter V. Section 5.5 – 5.6	Multiple Comparison Procedures: Post hoc analyses
		Confirm F test (F ratio), F Table Critical Values, & ANOVA Summary
		Review for Exam 2
	<b>Exam 2: 32points</b>	<b>Chapters 1 – 5.7</b>
5	Chapter V. Statistical Decisions: Parametric & Nonparametric Approaches (5.1 – 5.7)	F test & t Test Assumptions: When parametric & nonparametric Tests?
	Chapter V. Sections 5.8 – 5.14	Gaussian Distribution, Randomization, Parametric & Nonparametric Tests
	Chapter VIII. Experimental & Quasi- Experimental Designs	Threats to Internal and External Validity
6	Chapter VII. Writing Suggestions	Practice Detecting Internal Validity Threats & Writing Critical Reviews
	Chapter VI. Ethics & Science	Scientists Pledge, Violations & Consequences, Institutional Review Boards, & Historical Perspectives
6	Chapters IX & X	ANCOVA, Meta-Analysis, & Regression
		Review for Exam 3
	<b>Exam 3: 23 points</b>	<b>Chapters 5.8 – Chapters 10</b>

## SUCCESS, MOTIVATIONAL PERSPECTIVE, & OATH FOR SCIENTISTS:

Your Research Methods experiences will be meaningful given that you actively use the information in the *eBook (Research Methods: Functional Skills, Second 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 Zoom 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* 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 and do well!**

### **OATH FOR SCIENTISTS**

As I embark on my career as a scientist, I willingly pledge that I will represent my scientific profession honorably,

that I will conduct my research and my professional life in a manner that is always above reproach,

and that I will seek to incorporate the body of ethics and moral principles that constitute scientific integrity into all that I do.

I will strive always to ensure that the results of my research and other scientific activities ultimately benefit humanity and that they cause no harm.

With this affirmation, I pledge to acknowledge and honor the contributions of scientists who have preceded me, to seek truth and the advancement of knowledge in all my work, and to become a worthy role model deserving of respect by those who follow me.

Craig, C.R., et.al. *Science* 2003; 299.

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**Research Methods: Functional Skills (Second Edition eBook)** is 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.](#)

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

<https://itunes.apple.com/us/book/research-methods-functional/id591138108?mt=11&ign-mpt=uo%3D4>

3. Amazon – Kindle or Kindle Fire app reading:

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