

RESEARCH METHODS

APK 4050: 10609; 3 CREDITS; FALL 2021

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VIRTUAL OFFICE HOURS: Tuesday 4:30 – 6:00 PM or by appointment

MEETING TIME: Tuesday, Period 5 – 6 (11:45 AM – 1:40 PM and Thursday Period 6 (12:50 – 1:40 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 concepts, writing, and studies.

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

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*. ISBN: 978-1-939337-34-4 (eBook).

COURSE FORMAT: Lectures will encourage 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. Typically, students are asked at least one question a day.

COURSE LEARNING OBJECTIVES: By the end of this course, you 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 is expected. Keep in mind that your health and safety in our classroom may affect others, so stay home if you are sick.

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. Further, you are obliged to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please speak with the professor.

EXAM MAKE-UP POLICY: You will take three examinations in the classroom on the scheduled dates. If an emergency arises on an exam date, then a make-up exam should 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>.

A student experiencing an illness should visit the UF Student Health Care Center or their preferred healthcare provider to seek medical advice. If you have an illness, family emergency or death, please contact the Dean of Students Office (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 Dr. Cauraugh with a recommendation. Keep in mind that you should not provide any documentation to Dr. Cauraugh regarding an illness or family emergency. This is your personal, private, and protected information. The DSO is qualified to receive and verify the documents you provide.

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 DSO 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 the first exam. 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 are expected to provide **professional and respectful feedback** on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance is available at <https://gatorevals.ua.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.ua.ufl.edu/public-results/>.

GETTING HELP:

Health and Wellness

- U Matter, We Care: If you or a friend is in distress, please contact 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. <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/>

INCLUSION, DIVERISTY, AND ACCESSIBILITY RESOURCES

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

- Dr. Leo Ferreira, APK IDEA Liaison, ferreira@hhp.ufl.edu
- Dr. Rachael Seidler, APK Graduate Coordinator, rachaelseidler@ufl.edu
- Dr. Joslyn Ahlgren, APK Undergraduate Coordinator, jahlgren@ufl.edu

GRADING:

	<u>Points</u>
<i>Science Journals</i>	<i>4</i>
<i>Exam 1: September 28, Tuesday</i>	<i>32</i>
<i>Exam 2: November 2, Tuesday</i>	<i>32</i>
<i>Exam 3: December 17, Wednesday</i>	<u><i>32</i></u>
<i>[Cumulative Exam during Finals Week]</i>	
<i>Total</i>	<i>100</i>

OUR EXAM FORMAT IS A COMBINATION OF MULTIPLE CHOICE, SHORT ESSAY, AND LONG ESSAY

GRADING SCALE:

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

Previous students who answered questions during lectures, completed science journal entries, and scored well on the three 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.

WEEKLY COURSE SCHEDULE: READING SCHEDULE AND CONTENT

Exam questions are based on the eBook: *Research Methods: Functional Skills (2020; third edition)*. Given that the eBook has many slides embedded in the text, full sets of slides for lectures are not posted. Read the text and ask questions during lectures for clarity.

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.

Note: the content for any exam may change depending on class interactions and apparent course progress. If any changes are necessary, then we will discuss as a class before the exam.

Lecture	<i>Research Methods: Functional Skills (3rd edition)</i> <i>Chapter & Heading</i>	<i>Content</i>
1	Syllabus & Preface	Overview; Approach to Science; Importance of RM & Science
2	Chapter I: 1.1 – 1.5	Causal Relationships; Types of Research; Two Supreme Problem Solvers
3	1.6 – 1.11	Science, Exp. Design, Variability, & Statistics
4	Chapter II: 2.1 – 2.5	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	Chapter III: 3.1 – 3.4	Designs Vary by Three Criteria Different Designs: One-way & Two-way
7	3.5 – 3.8	Designs: Between-subjects, Within-subjects, & Mixed Review Questions for Exam 1
Sept. 28	Exam 1: 32 points	eBook Chapters: Preface, I, II, & III Strunk & White
1 & 2	Chapter IV: 4.1 – 4.7	Statistical Significance & Reminders One-tailed & Two-tailed Tests Multiple Comparison Procedures

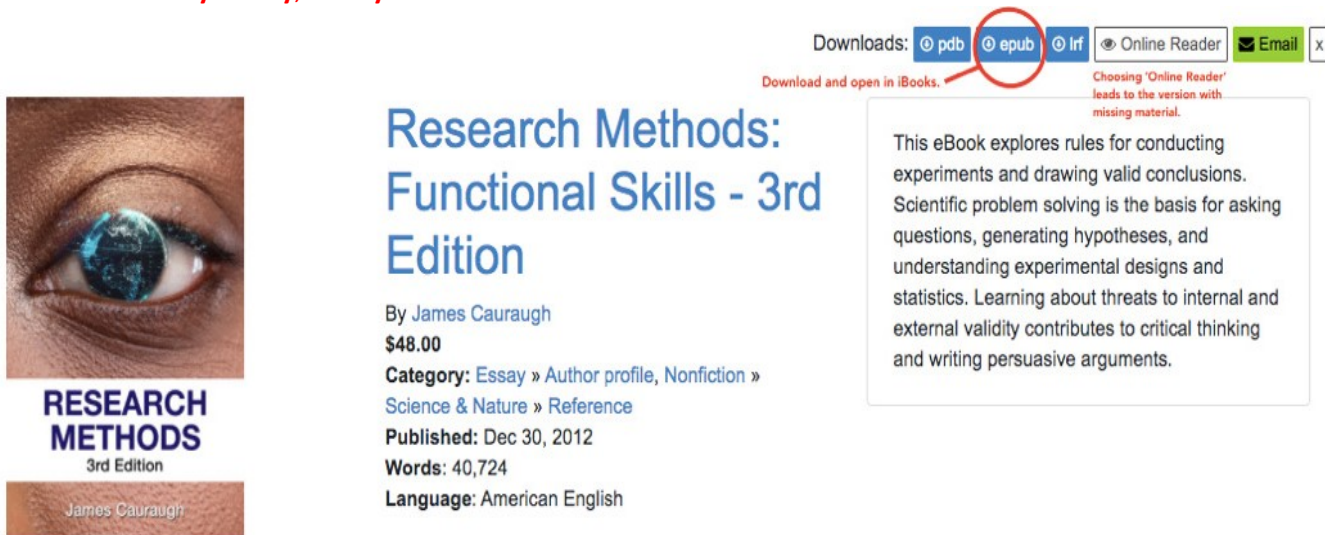
		Null & Alternative Hypotheses F Table Critical Values Truth Table & Power
3 & 4	Chapter V. 5.1 – 5.7	Internal and External Validity Eight Internal and Four External Threats Three Internally Valid True Experiments Three Pre-experimental Designs
5 & 6	Chapter VI: 6.1 – 6.10	Parametric & Nonparametric Statistics ANOVA Assumptions & Summary Table Chi-Square, Correlations, t & F Tests Hick-Hyman Law
Nov. 2	Exam 2: 32 points	eBook Chapters IV, V & VI Strunk & White
1 & 2	Chapter VII: 7.1 – 7.9	Research Integrity & Oath for Scientists Ethics in Life & Science Institutional Review Board Protecting Rights of Individuals
3 & 4	Chapter VIII: 8.1 – 8.12	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 in a Vaccination Doing the Right Thing
Dec. 17	Final Exam 3: 32 points: 10:00 AM – 12:00 PM	eBook Chapters VII, VIII, IX, & X Cumulative Final: Review Previous Chapters

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2. Cauraugh, J. H. (2020). *Research Methods: Functional Skills – Third Edition*. (eBook).

The 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 once you buy, then you will be able access and read in iBooks.**



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This eBook explores rules for conducting experiments and drawing valid conclusions. Scientific problem solving is the basis for asking questions, generating hypotheses, and understanding experimental designs and statistics. Learning about threats to internal and external validity contributes to critical thinking and writing persuasive arguments.

You own this book.

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>

SUCCESS, MOTIVATIONAL PERSPECTIVE, & OATH FOR SCIENTISTS:

Your Research Methods experiences will be meaningful given that you actively use the information in the eBook 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. 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!**

Research Methods: APK 4050, Section 10609
Science Journal: Watching, Reading, Thinking, and Writing

Fall 2021 Semester Schedule:
TED Talks, YouTube, Searching, and Reading Articles

- Lectures are given on Tuesday and Thursday
- Some Thursdays there will not be a lecture and you will complete an individual learning day
- **Twelve activities are scheduled for this semester**
- Use your new RM knowledge while **Watching, Reading, Thinking, and Writing**
- Writing and thinking about science and RM outside of the classroom is productive
- Here is an example of an entry on motor control after watching a novice 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 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?

Create one science journal file and save each entry. In October, you will send your file with your first six journal entries to a classmate for reading and a cursory review. At the same time, you will read a set of six journal entries written by a classmate. The evaluation criteria are writing style and organization. **To earn the full four points, you must complete three phases: (a) do journals 1 – 6, save in one file, and send them to a classmate for review, while you review her/his entries, (b) do journal entries 7 – 12, and (c) upload your science journal file with 12 entries at Assignments in Canvas by Thursday, December 2, 2021.**

1. Summarize a TED Talk (Ideas Worth Spreading)
 - a. Steven Johnson: **Where good ideas come from**
http://www.ted.com/talks/steven_johnson_where_good_ideas_come_from
2. Summarize a YouTube Talk
 - a. Bob Sallis, former ACSM President: **Exercise as medicine**
https://www.youtube.com/watch?v=luPzvjY55_8
3. Summarize a TED Talk
 - a. Wendy Suzuki: **The brain-changing benefits of exercise**
<https://www.youtube.com/watch?v=BHY0FxzoKZE>
4. Summarize a TED Talk
 - a. Carol Dweck: **The power of believing that you can improve**
https://www.ted.com/talks/carol_dweck_the_power_of_believing_that_you_can_improve?language=en
5. 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

6. Summarize a TED Talk
 - a. Daniel Amen: **The most important lesson from 83,000 brain scans**
<https://www.youtube.com/watch?v=esPRsT-lmw8>
7. Summarize a TED Talk
 - a. Barbara Arrowsmith-Young: **The woman who changed her brain**
<https://www.youtube.com/watch?v=o0td5aw1KXA>
8. Summarize a TED Talk
 - a. Margaret Heffernan: ***Dare to disagree***
http://www.ted.com/talks/margaret_heffernan_dare_to_disagree
9. Summarize a TED Talk
 - a. Lara Boyd: **After watching this, your brain will not be the same**
<https://www.youtube.com/watch?v=LNHBMFCzsnE>
10. Summarize a TED Talk
 - a. Roger Frampton: **Why sitting down destroys you**
<https://www.youtube.com/watch?v=jOJLx4Du3vU>
11. Summarize a TED Talk
 - a. Elizabeth Amini: **Top 10 tips to keep your brain young**
<https://www.youtube.com/watch?v=2tcEggTWbxQ>
12. Summarize a youth form speech and an introduction of Bill Gates
 - a. Sarah Abushaar **Addresses World Youth Forum 2018** | سارة أبو شعر تخاطب منتدى شباب العالم
٢٠١٨. November 7, 2018
<https://www.youtube.com/watch?v=EzZoV2veJkE>
 - b. Sarah Abushaar: **Bill Gates & the Power of Human Capital**; February 5, 2020
<https://www.youtube.com/watch?v=fMuAcFFVPMo&t=3s>