COURSE: Spring 2023, FISH 7350, Meta-analysis, 3 credit hours

INSTRUCTOR: Dr. Alan Wilson, Swingle 321, wilson@auburn.edu, 334-246-1120

LECTURE: Monday and Wednesday 12:00pm - 1:15pm Central Time

WHERE: Swingle 301 or via zoom link in Canvas

OPTIONAL HELP SESSION: Alan: Thursdays, 8-9am; Also, available by appointment, as needed.

REQUIRED PREREQUISITES: Advanced graduate students, postdocs, faculty

RECOMMENDED PREREQUISITES: Prior coursework in R-based courses, such as WILD 7150 (Steury)

STUDENT PUBLICATIONS FROM COURSE: http://wilsonlab.com/meta_class_pubs.html

FIELD OF STUDY: Meta-analysis is a quantitative approach for synthesizing results from diverse research studies that address a similar hypothesis. Effect sizes calculated from individual studies are combined to elucidate general patterns across studies. Like most approaches, meta-analysis has limitations (e.g., file drawer problem, dealing with varying publication quality). However, the technique can be a powerful option for identifying patterns in disciplines where the availability of large, under-analyzed datasets is common, such as ecology, psychology, medicine, and education.

COURSE OBJECTIVES & STUDENT LEARNING PHILOSOPHY: The course objectives represent a variety of tasks and skills that I expect students to have developed and mastered by the end of the course. Through participating in this course, you will (1) practice and develop your critical thinking skills (through in-class group discussions and presentations), (2) learn how to read and interpret the scientific literature, (3) broaden your understanding of meta-analysis, and (4) conduct your own meta-analysis.

REQUIRED MATERIALS IN CANVAS:

(1) Articles from the peer-reviewed literature
(2) R software (download it here https://www.r-project.org/)

GRADING:

Course grades are based on each student's cumulative performance for the following assignments:

Activity	Points	Grading scale
Homework (5 pt/each)	20	A = 90-100%
Peer review (5 pt/each)	15	B = 80-89%
Librarian meeting (10 pt)	10	C = 70-79%
Initial project presentation	20	D = 60-69%
Outlines (brief & manuscript) (10 pt/each)	20	F = 0-59%
Manuscript draft	30	
Final project presentation	40	
Paper	40	
Total points	195	

STUDENT EXPECTATIONS:
The course grade will be based on the following activities described below:

(1) *HOMEWORK*: To facilitate the learning process, homework associated with each component of conducting a meta-analysis will be assigned and due at the beginning of specific class days. Collaboration with other students, librarians, advisors, etc. is encouraged.

(2) *PEER REVIEW*: Each student will also serve as a peer-reviewer for another student to improve the final class paper The product of each peer-review will be submitted at the end of class. Students will also evaluate their peer-reviewer.

(3) *LIBRARIAN MEETING*: Meta-analysis is based on research synthesis. Auburn University's library is full of experts trained to help researchers search for, identify, locate, and retrieve publications on diverse topics. All students will be required to have at least one formal meeting with an AU librarian (one near the start of the class by February 8) and submit a short report about (1) who you met, (2) when you met them, (3) what information was gleaned from the meeting, and (4) an honest assessment of the value of the meeting.

(4) *PROJECT PRESENTATIONS AND OUTLINES*: All students will be required to present two presentations. The first, a 2-minute lecture given early in the semester, will describe their planned meta-analysis. A brief 1-page outline of the project will be due at the time of the initial presentation so that I can assist with project development. The second, a 10-minute lecture given in the latter half of the semester, will describe the meta-analysis that was conducted and the associated results. These lectures will be delivered and recorded during class time. A more developed manuscript outline will be due later in the semester. The students are expected to use the primary literature as references and data sources for these presentations.

(5) *FINAL PAPER DRAFT AND FINAL MANUSCRIPT*: All students will be required to submit a ~10-page paper associated with their meta-analysis project. A completed manuscript draft will be due after spring break. The paper should be prepared with submission to a journal in mind. Formatting should be specific to the target journal. Students are required to include their data and R code as a supplementary document and prepare a cover letter for submission. Students producing successful projects will be strongly encouraged and supported to submit their papers to a peer-reviewed journal.

PARTICIPATION: Although not explicitly graded, participation is critical to success in this course. To participate, you need to be at class on-time and prepared (i.e., perused readings, practice with software). Discussion is vital to an effective learning environment and participation grades will reflect involvement during classroom activities. Students need to think about papers and lectures critically and provide thoughtful questions and comments during each lecture.

FEEDBACK & EVALUATION:
This course is for you to learn important fundamental concepts and ideas on which to build your understanding of meta-analysis. Course evaluations will be completed by students in the middle and at the end of the semester so that course changes can be made to enhance the learning experience for this class and future classes. Students are encouraged to use an anonymous online survey form as needed - https://goo.gl/forms/ut92HzIhHOUtfxm62 Finally, students are always welcome to schedule a meeting with me to talk more about topics discussed in class.

COURSE CHANGES:
Although I expect to cover all the topics described in the syllabus, course changes will likely occur - especially based on feedback from the students. Consequently, I reserve the right to modify the course to enhance the learning experience where I deem appropriate. Course changes will be described verbally during class and/or in writing via email and/or handouts.

ACADEMIC HONESTY:
The Auburn University Student Academic Honesty Code (available at https://sites.auburn.edu/admin/universitypolicies/Policies/AcademicHonestyCode.pdf) clearly defines the university's honesty code. I expect all students to conduct themselves in my class with this Code in mind

ACCOMMODATIONS FOR DISABILITIES:
If you have a disability and/or a special need that requires accommodations, please inform me immediately so that I can develop a plan to work with you and arrange an appointment with a campus disabilities counselor.

LECTURE SCHEDULE AND ASSOCIATED READINGS (AVAILABLE IN CANVAS):

Day	Lecture topic
Jan 11	ALAN RUNNING USDA PROPOSAL REVIEW PANEL – NO CLASS
Jan 16	MLK HOLIDAY – NO CLASS
Jan 18	Introduction to meta-analysis; historical overview
	Discussion leader – Alan
Jan 23	Steps for conducting a meta-analysis
	Discussion leader – Alan
	Gurevitch et al. 2018, Polanin et al. 2017
	Research Question due
Jan 25	Discussion of Wilson et al. (2006) example
	Discussion leader – Alan
	Wilson et al. 2006
Jan 30	Where to find data? Get to know your university librarian to help locate papers!
	Discussion leader – Adelia Grabowsky (guest lecture)
	Forero et al. 2019; PRISMA 2020 checklist
Feb 01	Class exercise: locate papers for a targeted search
	Discussion leader – Alan
	Homework: submit results from targeted search; due February 08
Feb 06	Limitations of meta-analysis
	Discussion leader – Alan
	Glass 1976; Vrieze 2018
Feb 08	How to choose an effect size metric
	Discussion leader – Alan
	Gurevitch and Hedges 1999; Osenberg et al. 1997
	Summary of meeting with librarian due
Feb 13	How to choose data? How to extract data?
	Discussion leader – Alan
	Install ImageJ and metaDigitise (R package)
	Englund et al. 1999; Bown and Sutton 2010
Feb 15	Class exercise: extract and organize data
	Discussion leader – Alan
	Nakagawa et al. 2017
	Homework: submit results from data extraction; due February 22
Feb 20	Data management: tools and techniques for success
	Discussion leader – Ali Krzton (guest lecture) (ALAN IN DC)
	R for Data Science, by Wickham and Grolemund https://r4ds.had.co.nz
Feb 22	Advice from past students in this class
	Discussion leaders – Kaitlyn Murphy and Emily Driessen (ALAN IN DC)
Feb 27	Brief project descriptions (2 minutes with 1 PowerPoint slide)
	Presenters – all students
	Student project outlines due and brief (2 minutes) introduction presentation
Mar 01	Class exercise: how to calculate an effect size?
	Discussion leader – Alan (*metafor* intro)
	Install MS Excel and RStudio (or R) with *metafor* package on your laptop
	Homework: submit effect size data; due March 08
	midterm course evaluation

Mar 06	**SPRING BREAK – HAVE FUN AND BE CAREFUL**
Mar 08	**SPRING BREAK – HAVE FUN AND BE CAREFUL**
Mar 13	**Standard statistics and meta-analysis; (ir)relevance of null hypotheses & *P*-values**
	Discussion leader – Alan
	Borenstein et al. 2009 (chapters 10-16)
Mar 15	**Tips for preparing a manuscript for a journal and data visualization advice**
	Discussion leader – Alan
	Borja 2014; Gewin 2018; Hsieh 2018; Nakagawa et al. 2021
Mar 20	**Advanced meta-analysis statistics**
	Discussion leader – Jordan Eckert (guest lecture)
	Furukawa et al. 2006
	***Manuscript outlines due* (choose an appropriate journal, consider author guidelines, and develop a manuscript outline)**
Mar 22	**Class exercise: conduct thorough meta-analysis, including moderator and sensitivity analyses**
	Discussion leader – Alan
	Homework: submit results from meta-analysis; due March 29
Mar 27	**Discuss current meta-analyses *and small group discussion***
	Discussion leaders – Alan et al.
	TBD
Mar 29	**Student presentations (10 minutes - PowerPoint; recorded)**
	None
Apr 03	**Discuss current meta-analyses *and small group discussion***
	Discussion leaders – Alan et al.
	TBD
Apr 05	**Student presentations (10 minutes - PowerPoint; recorded)**
	None
Apr 10	**Discuss current meta-analyses *and small group discussion***
	Discussion leaders – Alan et al.
	TBD
Apr 12	**Student presentations (10 minutes - PowerPoint; recorded)**
	None
	Complete manuscript drafts due
Apr 17	**Peer-review of manuscripts**
	Peer-review summary due by end of day
Apr 19	**Student presentations (10 minutes - PowerPoint; recorded) (if needed)**
	None
Apr 24	**Peer-review of manuscripts**
	Peer-review summary due by end of day
Apr 26	**Peer-review of manuscripts**
	Peer-review summary due by end of day
	Final paper due with cover letter and supplementary materials, such as dataset and R code*; *final course evaluation