

Psychology 682: The Aging Brain
Online, Spring 2020, UNDERGRAD SYLLABUS

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****Email availability:** I am generally available via email from 9 am – 5 pm on weekdays. I typically check email up until 10 pm on weekdays and at various points on weekends, and may answer your question at these times as my schedule allows. However, you should not expect to receive an answer to any emails received after 5 pm until after 9 am on the next weekday.

Course format:

- **This course will be conducted entirely online.**
- All course business will be conducted on Canvas.
- Quizzes are best taken on a computer or laptop hardwired into the wall to prevent a loss of signal from causing an error when you submit. **Cell phones are NOT recommended for taking quizzes** because signal problems often lead to errors in submitting.
- For questions about accessing or working Canvas, please contact the UWM Help Desk *before* contacting the instructor. The Help Desk staff knows Canvas far better than Dr. Frick and can answer your questions better and faster than she can. The Help Desk can be reached in any of the following ways:
 - 414-229-4040 or 877-381-3459 (toll free)
 - <https://uwm.cherwellondemand.com/CherwellPortal/CampusTechnology#0>

Course description and learning objectives:

The goal of this course is to understand how the brain and behavior change with age. Using data from both humans and animal models, we will discuss current theories of aging, biological and psychological effects of aging, how neurodegenerative diseases such as Alzheimer's disease devastate the individual and society, and ways in which to age "successfully". Readings will consist of textbook chapters, review articles, and primary empirical literature. By the end of this course, students should have learned:

- How aging affects the brain and various aspects of psychological function
- How neurodegenerative diseases such as Alzheimer's and Parkinson's differ from "normal" aging
- How animal models of aging are used to understand aging in humans
- To critically read and critique empirical research papers
- To think critically about topics in aging, and actively engage in scholarly discussion of and writing about these topics

Prerequisite:

Successful completion of Physiological Psychology (Psych 254) or a related course is required for this course. This prerequisite is necessary because you must understand how the brain works to understand the concepts covered in this course. You should know how neurons work (e.g., parts of a neuron, how action potentials are generated), communicate (e.g., receptors, neurotransmitters, neurotransmission), and are organized in the brain (e.g., basic neuroanatomy, neural circuitry). Some of this information will be reviewed early in the semester, but extensive tutoring on these topics will not be provided because it is assumed you have learned them previously.

Readings (all required):

- Text:
 - Woodruff-Pak, D. S. (1997). *The Neuropsychology of Aging*. Blackwell Publishers, Oxford: UK. The text is available at the UWM Virtual Bookstore and at online booksellers like Amazon.com and Barnes & Noble. Yes, this text is old, but it provides important background material appropriate for your level in a way that other sources do not. The text will be supplemented with more recent materials.
- Additional readings:
 - The neuropsychology of aging is an interdisciplinary field, drawing upon psychological and neurobiological research in both humans and non-human animals. Thus, there is no one textbook that can adequately summarize the findings in all areas of aging research. For this reason, the text will be supplemented by primary research articles and reviews of the literature. These readings can be found in the Home page on Canvas in the sections corresponding to each course week.

Student expectations and responsibilities:

- Students are expected to do the assigned weekly readings, take weekly quizzes on time, contribute meaningfully to class discussions, and complete all written assignments on time.
- Students are expected to take primary responsibility for their performance in this course and are strongly encouraged to contact the instructor with questions about course content, format, or instructions.
- Because this is an online course, you have *far more responsibility* for ensuring your adequate course progress than in a typical face-to-face course. You will be given a certain amount of flexibility in completing course requirements (e.g., when during the week you choose to take the weekly quiz before the Sunday night deadline), but it is imperative that you complete these requirements on time or your grade will suffer.
- *****It is your responsibility to read this syllabus completely to be aware of due dates and course policies. Although the instructor may remind you of some important deadlines, it is your responsibility to complete all work in this course on time.**
- This course contains at least as much (if not more) content as the face-to-face version, so do not assume that this course will be less work because it is online.
- Netiquette:
 - It is expected that students will engage in proper “Netiquette” while interacting with the instructor and other students online.
 - Proper Netiquette abides by the basic principle, “Do unto others as you would have them do unto you.”
 - All of your classmates and I can read whatever you post, so choose your words carefully.
 - Hostile, threatening, or inappropriate comments posted to the discussion board or emailed to other course participants are serious breaches in academic integrity and will not be tolerated. Although disagreements are encouraged in discussions, *abuse and cruelty will not be tolerated*. Such posts will lower your grade in the course.
 - Tips for effective emails and posts:
 - Properly address your emails, e.g., “Dear Dr. Frick” or “Hi Cindy”
 - Review your email/post before you send it to ensure proper tone and clarity.
 - Minimize use of all caps or other text that could be construed as yelling.

- Be kind to others and tolerant of errors in their emails/posts. You could easily make the same error.
- Most importantly, strive for each email/post to achieve a constructive objective (e.g., getting a question answered, seeking or providing feedback).

Assessment:

Grades in this course will be determined as follows:

Learning Objective	Assignment	Points	% of grade
Demonstrate knowledge of basic course concepts	12 weekly quizzes (20 points each, <i>will drop the lowest 2</i>)	200	62.5
Demonstrate ability to think critically about concepts, and participate constructively and intelligently in discussions of topics relevant to course materials	Discussion participation (weeks 1, 3, 10, and 15)	80	25
Demonstrate ability to think critically about concepts, and write about them clearly and articulately	Discussion position papers (weeks 10 and 15)	40	12.5
	<i>Total</i>	<i>320</i>	<i>100</i>
Three extra credit opportunities will be offered: 1) Literature critique: Learn to carefully read an empirical article, summarize it, and critique it. 2) Learning strategies: Better learn how to study for this course. 2) Research participation: participate as a subject in research studies to gain first-hand knowledge of how psychological research is conducted.	1) Literature critique (8 possible points) 2) Learning strategies (8 possible points) 3) Research participation (16 possible points)	Up to 16 points total	Up to 5% added to final grade

Grades in this course will NOT be curved. Quiz, position paper, and discussion grades will be earned according to the following scale: A=94-100%, A-=90-93%, B+=86-89%, B=83-85%, B-=80-82%, C+=76-79%, C=73-75%, C-=70-72%, D+=66-69%, D=63-65%, D-=60-62%, F=<60%. Final grades will be calculated according to the same scale. The final point values that correspond to these grades are listed below.

Final Points	Percent	Grade
320-299	94-100	A
298-287	90-93	A-
286-274	86-89	B+
273-264	83-85	B
263-255	80-82	B-
254-242	76-79	C+
241-232	73-75	C
231-223	70-72	C-
222-210	66-69	D+
209-200	63-65	D
199-191	60-62	D-
190 and below	less than 60	F

Course schedule:

Course week	Week of	Topic	Assessment
1	Jan. 20	What is Aging? Discussion #1 <i>Topic= Introductions, general issues in aging</i>	-Syllabus quiz -Weekly quiz -Discussion participation
2	Jan. 27	Research Methods & Theories of Aging	-Weekly quiz
3	Feb. 3	Neuroscience Review Discussion #2 <i>Topic= Issues in longevity</i>	-Weekly quiz -Discussion participation
4	Feb. 10	Aging of the Brain & Sensory Systems	-Weekly quiz
5	Feb. 17	Memory in Humans	-Weekly quiz
6	Feb. 24	Memory in Animal Models	-Weekly quiz
7	Mar. 2	Alzheimer's Disease I—Neuropathology & Symptoms	-Weekly quiz
8	Mar. 9	Alzheimer's Disease II—Potential Causes and Video	-Weekly quiz
9	Mar. 16	Spring break—no assignments	
10	Mar. 23	Discussion #3 <i>Topic= Plan for Alzheimer's disease and dementia</i> Discussion position paper due on Mar. 29 by 11:59 pm	-Discussion participation -Discussion position paper
11	Mar. 30	Intelligence/Language & Mood/Sleep	-Weekly quiz
12	Apr. 6	Reproduction	-Weekly quiz
13	Apr. 13	Motor Systems/Parkinson's	-Weekly quiz
14	Apr. 20	Aging Successfully	-Weekly quiz
15	Apr. 27	Discussion #4 <i>Topic= Plan for healthy aging</i> Discussion position paper due on May 3 by 11:59 pm All extra credit assignments due by May 8 at 5 pm	-Discussion participation -Discussion position paper

Weekly quizzes:

- You will take weekly quizzes in 12 weeks during the course as indicated above.
- All quizzes are taken in Canvas. Quizzes can be found on the Home page in the sections for each class week and on the Quizzes page.
- Quizzes consist of 20 objective questions (multiple choice, true/false) graded automatically by Canvas. You will receive immediate feedback.
- Quizzes should be taken *closed notebook*, so please do not cheat and use your notes.
- **SUPER IMPORTANT INFORMATION ABOUT QUIZZES—PLEASE READ BELOW!!!!**
 - You can take the quiz at any point during the week, but must submit the quiz by 11:59 pm Sunday of the week or you will receive a 0 for the quiz. Given this flexibility, no make-up quizzes will be allowed.
 - Once you start a quiz, you will have 20 minutes to submit it. Late submits will be penalized 1 point for each 5 minutes the quiz is submitted late.
 - You can only take each quiz once, so please be sure you are ready to take a quiz before you start it. Save your answers after each question to ensure that all answers are recorded.
 - Each quiz will ONLY be available for one week--the week indicated in the table above. (e.g., the Week 3 quiz will only be available during Week 3 of the course). This means that you cannot go back and take a quiz you missed earlier in the semester.

- Your 2 lowest-scoring quiz grades will be dropped. Thus, only your highest 10 quiz grades will count towards your final grade.
- You will be introduced to quizzes by taking a quiz on this syllabus. This quiz must be passed with a score of 90% before you will be able to take the first weekly quiz. Therefore, you can retake this quiz as many times as you need to in order to pass. NOTE: The syllabus quiz does NOT count towards your final grade!
- **THERE IS NO FINAL EXAM FOR THIS COURSE.**

Discussions:

- Discussions are critical to allow us to get to know each other in the online domain and exchange ideas about the course material.
- We will engage in four discussions during the course of the semester as follows:

<u>Calendar week</u>	<u>Course week</u>	<u>Topic</u>
Jan. 20	1	Student introductions and general issues in aging
Feb. 3	3	Issues in longevity
Mar. 23	10	Plan for Alzheimer's disease and dementia research <i>Discussion position paper due by 11:59 pm Mar. 29</i>
Apr. 27	15	A national plan for healthy aging <i>Discussion position paper due by 11:59 pm May 3</i>

- Download the "Discussion and Position Paper Guide" from the Course Information section of the Home page, and read it carefully. Discussions will be graded in Canvas according to the grading rubric described in the guide.
- As described in the guide, you should post at least five times per discussion. These 5 posts include:
 - 1) your initial post (1 post)
 - 2) your responses to two other student's posts (2 posts)
 - 3) your replies to at least two responses to your own postings (2 posts)
- All discussion posts should follow proper Netiquette (see above).
- For Discussions 3 and 4, you will also write a **position paper** that allows you to expand upon your own discussion postings to eloquently, but succinctly, describe your plans for Alzheimer's and healthy aging. Positions papers should be up to one-page, single-spaced. Instructions for writing this paper described in the guide.

Extra Credit Opportunities:

- 3 extra credit opportunities will be offered during the semester, of which you can complete 2 to earn up to 16 points of extra credit.
- Each opportunity is worth 8 points (thus, if you complete 2, you will earn the maximum 16 points).
- All extra credit is due by May 8 at 5 pm.
- Opportunities are as follows:
 - A **Literature critique** to give you experience summarizing and discussing the strengths and weaknesses of a research article. The amount of extra credit given will be directly related to the quality of the critique, with a total of up to 8 points added to your final grade. Detailed instructions can be found in the Extra Credit section of the Home page in Canvas.
 - A **Learning Strategies** assignment to provide you with useful information about how to study for this course and handle potential obstacles to your success (e.g., a blown quiz). To access the assignment, go to the Learning Strategies section of the Home page and click on the assignment. You will watch 5 videos (embedded in Canvas) and answer two questions about each in Canvas. Grades will be based on satisfactory answers to the questions (e.g.,

your answers show evidence of having watched the videos and given the questions critical thought)

- **Research participation credit** for participating as a subject in research studies conducted by faculty and students in Psychology. This experience will give you first-hand knowledge of how psychological research is conducted. You may earn 8 points for 1 hour of research participation. If you conduct 2 hours of research, then you will earn the maximum 16 points of extra credit. Access these research projects through the SONA website—see the Extra Credit section in the Home page on Canvas.

On average, students should expect to make the following minimum time commitment in this course:

<u>Course element</u>	<u>(Min/week) x (# of weeks) = hours</u>
Reading weekly notes and slides:	180/60 x 15 = 45 hours
Assigned Reading:	210/60 x 15 = 52.5 hours
Studying for weekly quiz:	120/60 x 15 = 30 hours
4 discussions:	60/60 x 4 = 4 hours
Discussion positions papers:	180/60 x 2 = 6 hours
Total semester commitment:	137.5 hours (45.83/credit)

Weekly average (15 weeks):

9.17 hours

In sum, you should plan to devote **at least 9 hours/week to this course** (137.5 hours across the entire semester). Bear in mind that this is a minimum time commitment, and that more time may be required to prepare effectively for the exams.

University Policies:

Information on university policies on participation by students with disabilities, accommodation for religious observances, complaint procedures, grade appeal procedures, and other standing policies (e.g., sexual harassment, incompletes) can be found here:

<https://uwm.edu/secu/wp-content/uploads/sites/122/2016/12/Syllabus-Links.pdf>

Students with Disabilities:

If you have a documented disability and need accommodations to meet any of the requirements of this course, please contact me as soon as possible. I will need a copy of your official Accommodation Plan (formerly known as a VISA), which, if you have one, will be emailed to me by the Accessibility Resource Center (Mitchell 112, <http://uwm.edu/arc/>, phone 414-229-6287).

Academic Misconduct:

In this course, we will strictly adhere to UWM's policy regarding academic misconduct. UWM does not tolerate academic misconduct, in any form. Cheating and plagiarism are examples of academic misconduct. Here is the university's definition: "an act in which a student seeks to claim credit for the work or efforts of another without authorization or citation, uses unauthorized materials or fabricated data in any academic exercise, forges or falsifies academic documents or records, intentionally impedes or damages the academic work of others, engages in conduct aimed at making false representation of a student's academic performance, or assists other students in any of these acts." Information about the procedures that are followed when a student is suspected of academic misconduct can be found on this web page:

<http://uwm.edu/academicaffairs/facultystaff/policies/academic-misconduct/>

Schedule of Course Readings (all but the Woodruff-Pak chapters are posted on Canvas)

<u>Week of</u>	<u>Reading</u>
Jan. 20	<ul style="list-style-type: none"> • Woodruff-Pak, Chapter 1 • Olshansky, S.J. et al. (Apr.,1993). The aging of the human species. <i>Scientific American</i>, 46-52. • Olshansky, S.J. (2013). Can a lot more people live to one hundred and what if they did? <i>Accident Analysis and Prevention</i>, 61, 141-145. • Dong, X. et al., (2016). Evidence for a limit to human lifespan, <i>Nature</i>, 538, 257-259.
Jan. 27	<ul style="list-style-type: none"> • Woodruff-Pak, Chapters 2 and 3 • Rusting, R. (Dec., 1992). Why do we age? <i>Scientific American</i>, 130-141. • Orr, W.C. and Sohal, R.S. (1994). Extension of life-span by overexpression of superoxide dismutase and catalase in <i>Drosophila melanogaster</i>. <i>Science</i>, 263, 1128-1130. • Melov, S. et al. (2000). Extension of life-span with superoxide dismutase/catalase mimetics. <i>Science</i>, 289, 1567-1569. • Kirkwood, T.B.L. (2017). Why and how are we living longer? <i>Experimental Physiology</i>, in press. • Weindruch, R. (Jan., 1996). Caloric restriction and aging. <i>Scientific American</i>, 46-52.
Feb. 3	<ul style="list-style-type: none"> • Carlson, N.R. (2007). Chapter 2, Structure and Functions of Cells of the Nervous System. <i>Physiology of Behavior</i>, 9th ed. New York: Allyn & Bacon. • Carlson, N.R. (2007). Chapter 3, Structure of the Nervous System. <i>Physiology of Behavior</i>, 9th ed. New York: Allyn & Bacon. • Carlson, N.R. (2007). Chapter 4, Psychopharmacology. <i>Physiology of Behavior</i>, 9th ed. New York: Allyn & Bacon. • Oakley, B. and Schafer, R. (1978). <i>Neuroanatomy: Dissection of the Sheep Brain</i>. Ann Arbor: University of Michigan Press.
Feb. 10	<ul style="list-style-type: none"> • Woodruff-Pak, Chapters 4 and 5 • Wickelgren, I. (1996). Is hippocampal cell death a myth? <i>Science</i>, 271, 1229-1230. • Rapp, P.R. and Gallagher, M. (1996). Preserved neuron number in the hippocampus of aged rats with spatial learning deficits. <i>Proceedings of the National Academy of Sciences</i>, 93, 9926-9930. • Wickelgren, I. (1996). For the cortex, neuron loss may be less than thought. <i>Science</i>, 273, 48-50.
Feb. 17	<ul style="list-style-type: none"> • Woodruff-Pak, Chapters 11 and 13 • Bruce, P.R. and Herman, J.F. (1983). Spatial knowledge of young and elderly adults: Scene recognition from familiar and novel perspectives. <i>Experimental Aging Research</i>, 9, 169-173. • Sharps, M.J. and Gollin, E.S. (1987). Memory for object locations in young and elderly adults. <i>Journal of Gerontology</i>, 42, 336-341. • Moffat, S.D. et al. (2001). Age differences in spatial memory in a virtual environment navigation task. <i>Neurobiology of Aging</i>, 22, 787-796. • Moffat, S.D. et al., (2006). Age differences in the neural systems supporting human allocentric spatial navigation. <i>Neurobiology of Aging</i>, 27, 965-972. • Lester, A.W. et al., (2017). The aging navigational system. <i>Neuron</i>, 95, 1019-1035.
Feb. 24	<ul style="list-style-type: none"> • Barnes, C.A. (1998). Memory changes during normal aging: Neurobiological correlates. In: J. Martinez and R. Kesner (Eds), <i>Neurobiology of Learning & Memory</i> (pp. 247-287). San Diego, CA: Academic Press.

	<ul style="list-style-type: none"> • Burns, S.N. and Barnes, C.A. (2006). Neural plasticity in the ageing brain. <i>Nature Reviews Neuroscience</i>, 7, 30-40. • Astur, R.S. (2002). Humans with hippocampus damage display severe spatial memory impairments in a virtual Morris water task. <i>Behavioural Brain Research</i>, 132, 77-84.
Mar. 2	<ul style="list-style-type: none"> • Woodruff-Pak, Chapter 6 • Fleischman, D.A. and Gabrieli, J. (1999). Long-term memory in Alzheimer's disease. <i>Current Opinion in Neurobiology</i>, 9, 240-244. • Aisen, P.S. et al., (2017). On the path to 2025: Understanding the Alzheimer's disease continuum. <i>Alzheimer's Research & Therapy</i>, 9, 60. • Scinto, L.F.M. et al. (1994). A potential noninvasive neurobiological test for Alzheimer's disease. <i>Science</i>, 266, 1051-1053. • Rowe, CC, et al. (2007). Imaging β-amyloid burden in aging and dementia. <i>Neurology</i>, 68, 1718-1725.
Mar. 9	<ul style="list-style-type: none"> • Chapman, P.F. et al. (2001). Genes, models and Alzheimer's disease. <i>Trends in Genetics</i>, 17, 254-261. • Selkoe, D.J. and Hardy, J. (2016). The amyloid hypothesis of Alzheimer's disease at 25 years. <i>EMBO Molecular Medicine</i>, 8(6), 595-608. • Morgan, D. et al. (2000). Aβ peptide vaccination prevents memory loss in an animal model of Alzheimer's disease. <i>Nature</i>, 408, 982-985. • Sevigny, J. et al. (2016). The antibody aducanumab reduces Aβ plaques in Alzheimer's disease. <i>Nature</i>, 537, 50-56. • Underwood, E. (2015). Can sound open the brain for therapies? <i>Science</i>, 347(6227), 1186-1187. • Gwyther, L.P. (2000). Family issues in dementia: Finding a new normal. <i>Neurologic Clinics</i>, 18, 993-1010. • VIDEOS: Watch "The Forgetting: A Portrait of Alzheimer's" Parts I and II in Canvas
Mar. 16	No readings, SPRING BREAK
Mar. 23	No readings, DISCUSSION #3 AND DISCUSSION POSITION PAPER
Mar. 30	<ul style="list-style-type: none"> • Woodruff-Pak, Chapters, 7, 8, 10, and 12 • Schaie, K.W. (1994). The course of adult intellectual development. <i>American Psychologist</i>, 49(4), 304-313.
Apr. 6	<ul style="list-style-type: none"> • Sternbach, H. (1998). Age-associated testosterone decline in men: Clinical issues for psychiatry. <i>American Journal of Psychiatry</i>, 10, 1310-1318. • Pines, A. (2011). Male Menopause: Is it a real clinical syndrome? <i>Climacteric</i>, 14(1), 15-17. • Kimura, D. (1999). Sex differences in the brain. <i>Scientific American</i>, 32-37. • Frick, K.M. et al., (2017). Estrogenic regulation of memory consolidation: A look beyond the hippocampus, ovaries, and females. <i>Physiology & Behavior</i>, in press. • Astur, R.S. et al. (2004). Sex differences and correlations in a virtual Morris water task, a virtual radial arm maze, and mental rotation. <i>Behavioural Brain Research</i>, 151, 103-115. • Sherwin, B.B. and Henry, J.F. (2008). Brain aging modulates the neuroprotective effects of estrogen on selective aspects of cognition in women: A critical review. <i>Frontiers in Neuroendocrinology</i>, 29, 88-113. • Shumaker, S.A. et al. (2003). Estrogen plus progestin and the incidence of dementia and mild cognitive impairment in postmenopausal women. <i>Journal of the American Medical Association</i>, 289, 2651-2662.
Apr. 13	<ul style="list-style-type: none"> • Woodruff-Pak, Chapter 9

	<ul style="list-style-type: none"> • Lozano, A.M. and Kalia, S.K. (2005). New movement in Parkinson's. <i>Scientific American</i>, July, 18-25. • Kalia, S.K. and Lang, E. (2015). Parkinson's disease. <i>Lancet</i>, 386, 896-912. • Betarbet, R. et al. (2000). Chronic systemic pesticide exposure reproduces features of Parkinson's disease. <i>Nature Neuroscience</i>, 3, 1301-1306. <p>VIDEOS: Watch "Frozen Addicts" Parts I and II in Canvas</p>
Apr. 20	<ul style="list-style-type: none"> • Shiamura, A.P. (1995). Memory and cognitive abilities in university professors: Evidence for successful aging. <i>Psychological Science</i>, 6, 271-277. • Frick, K.M. and Benoit, J.D. (2010). Use it or lose it: Environmental enrichment as a means to promote successful cognitive aging. <i>TheScientificWorldJOURNAL</i>, 10, 1129-1141. • Yaffe, K. et al. (2001). A prospective study of physical activity and cognitive decline in elderly women: Women who walk. <i>Archives of Internal Medicine</i>, 161, 1703-1708. • Kempermann, G. et al. (1998). Experience-induced neurogenesis in the senescent dentate gyrus. <i>Journal of Neuroscience</i>, 18, 3206-3212. • VIDEOS: Watch "Stealing Time" Parts I and II in Canvas
Apr. 27	No readings, DISCUSSION #4 AND DISCUSSION POSITION PAPER