

Gerontechnology I

Fall 2017

Tuesdays / Thursdays 9:10 – 10:25

Course Instructors

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Course Web Page

The class web page is available at <http://eecs.wsu.edu/~cook/gt1>. Most of the class materials are available online, including the syllabus, homework assignments, papers, and lecture materials. *Instructional materials can be accessed at this web page.* Note that the syllabus, assignment descriptions, submissions, and grades are all accessed via Blackboard. Log in to Blackboard with your WSU ID and password at <https://learn.wsu.edu/webapps/login/>.

Catalog Course Description

Psych 485 / CptS 485 Gerontechnology I 3 Course Prerequisite: Certified in major or consent of instructor.

Required Instructional Material

Given that this is an emerging area of study, there are no available textbooks that fully cover the integrated aspects of the course material. Instead, students will be reading original research articles as well as book chapters to develop both breadth and depth in the subject matter of Gerontechnology. A list of reading materials that may be updated to include additional readings can be found at the end of the course syllabus. There are a few Gerontechnology books that are available as optional resources, these are listed at the end of the syllabus as well.

Course Overview

In this class, we will introduce the principles of Gerontechnology, an interdisciplinary field that combines gerontology and technology. The class will consist of lectures, group discussion, guest presentations, an experiential component working with older adults, and a multi-disciplinary research project. It is assumed that students enrolled in Gerontechnology I will also register and complete the follow-on class in the spring, Gerontechnology II. Following completion of this course, students should (1) have an understanding of the major topics of research in Gerontechnology, (2) have a basic understanding of the aging process and research methodology in aging, which will provide the foundation for development of assistive technologies, (3) have a working knowledge of basic technologies that are used to monitor, assess and assist the health of older adults, and (4) have gained experience working with older adults and in multi-disciplinary research teams.

Specific Course Learning Outcomes and Assessments

Because this class includes aspects of scientifically-validated psychological testing and an introduction to engineering methods for data collection, analysis, and design of health-assistive tools, it provides a unique opportunity to strengthen skills in each of the WSU Seven Learning Goals and Outcomes: 1) Critical and Creative Thinking, 2) Quantitative Reasoning, 3) Scientific

Literacy, 4) Information Literacy, 5) Communication, 6) Diversity, and 7) Depth, Breadth, and Integration of Learning. The methods and measures for each goal is summarized in the table.

WSU Learning Outcome	Goal (by end of course)	Course topics that address the learning outcome	Evaluation
Critical and Creative Thinking	Assess the accuracy and validity of presented study results, define strategy to address posed challenges related to aging	<ul style="list-style-type: none"> • Research methodology in aging • Human factors • Ethics, acceptance 	<ul style="list-style-type: none"> • Speaker summaries • Poster • Critical questions • Homework Assignment • Service learning report
Quantitative Reasoning	Grasp properties involved in psychological assessment; grasp methods of sensor-based data collection and analysis	<ul style="list-style-type: none"> • Sensors • Smart environments • Research methods 	<ul style="list-style-type: none"> • Homework assignment • Speaker summaries • Poster
Scientific Literacy	Identify issues related to aging, be aware of and understand state-of-the-art research in Gerontechnology	<ul style="list-style-type: none"> • Aging and: senses, health care, mobility, cognition, everyday function • Guest lectures on current research 	<ul style="list-style-type: none"> • Speaker summaries • Poster • Critical questions • Homework Assignment
Information Literacy	Be able to access and utilize literary resources to understand a Gerontechnology challenge	<ul style="list-style-type: none"> • Research methods • Research projects 	<ul style="list-style-type: none"> • Speaker summaries • Poster • Critical questions
Communication	Present the results of a research project and service learning orally and in writing	<ul style="list-style-type: none"> • Research project • Service learning project 	<ul style="list-style-type: none"> • Speaker summaries • Poster • Service learning report
Diversity	Be aware of ethical issues related to Gerontechnology; understand diversity of cultures in views on aging	<ul style="list-style-type: none"> • Ethics • Service learning project 	<ul style="list-style-type: none"> • Service learning report • Critical questions
Depth, Breadth, and Integration of Learning	Understand issues related to practical application of technologies to address issues in aging	<ul style="list-style-type: none"> • Guest lectures on current research • Multi-disciplinary research project 	<ul style="list-style-type: none"> • Guest lecture summaries • Poster • Service learning report

Course Requirements

- (1) *Service Learning Project (15%)*. You will spend 6 hours working with older adults in the community and/or observing therapists in a formal care setting. You will be required to write a paper about your experiences (see details in WSU Service Learning project section). Papers are due to Blackboard by 9am on 11/28. The submission page is under the Assignments tab in Blackboard.
- (2) *Critical Questions and Summaries of Guest Speakers (30%)*.
 - a. *Critical Questions*: You will have one required reading for almost all class periods. Prior to the beginning of those class periods labeled as critical question due, you are to submit to Blackboard one question which demonstrates that you have thoughtfully read and evaluated the paper for the class period. We will use the questions to enrich classroom discussion about the material. The submission page is under the Assignments tab in Blackboard.
 - b. *Summaries*: We will bring in eight experts this semester who will talk about state of the art research in Gerontechnology and their experiences in clinical application of the technologies. You will be required to write a two-page discussion of *six of the eight* invited talks. The summaries are due prior to the beginning of the next class period and are to be submitted to Blackboard. The submission page is under the Assignments tab in Blackboard. The write-up will include:
 - i) a summary of the talk and paper (if provided)
 - ii) a discussion of how the work fits within the context of the materials being discussed in class
 - iii) your ideas about how the speaker's work could be improved or extended in the future
- (3) *Homework Assignment (10%)*. You will be given one homework assignment to complete. This assignment will involve collecting and analyzing smartphone data while performing your own normal and scripted activities. *The completed homework assignment should be submitted to Blackboard by 9am on 10/12*. The submission page is under the Assignments tab in Blackboard.
- (4) *Research Project (40%)*. Throughout the Gerontechnology I class (and Gerontechnology II class), you will contribute to an ongoing multi-disciplinary Gerontechnology research project. You will present your project to the class, including study hypothesis and methods and receive feedback (project presentation dates: 10/31 and 11/2). You will also present a poster at the end of the semester (12/7) highlighting the project and your contributions and discuss your research results with visitors at the poster session. Posters are to be emailed to reanne.cunningham@wsu.edu by 9am on 12/5. See Research Project section below for additional details.
- (5) *Class Participation (5%)*. You will be encouraged to attend class, ask questions, and participate in class discussions.

Research Project

One of the requirements for this class is that you contribute to a research project focused on applying technology to one of the health challenges discussed in this class. Faculty, researchers, and graduate students will visit the class to describe ongoing research studies and you will have an opportunity to choose one of the projects on which you will work. Each of the projects is multidisciplinary, combining ideas and expertise from Psychology, Engineering, and Computer Science. Due dates related to the project are listed below.

- August 29 – August 31: Graduate students will visit class to describe their experiences in past Gerontechnology projects and we will review ongoing research projects to which you may contribute.
- September 5: Send email with your top two choices for research projects by 9am to reanne.cunningham@wsu.edu. Project groups will be assigned by the following class on September 7.
- September 12 – December 7: Spend a minimum of 6 hours each week contributing to research project. Meeting times with graduate mentors and instructors to discuss your project are integrated into the class schedule during this time.
- October 31 / November 2: Present your project proposal and plan to the class in order to receive feedback and suggestions from the instructors and from the class.
- December 10: Email a pdf file containing a 36"x48" poster highlighting details of your research work to reanne.cunningham@wsu.edu by 9am. The poster will be printed and displayed for the poster session.
- December 12: Poster session. Discuss the research project, your contribution, your plans for ongoing work to visitors at the class poster session.

****IMPORTANT: CITI Training:** Before you begin work on your research project you will need to complete the CITI ethics training and email your completed certificate to Reanne Cunningham at reanne.cunningham@wsu.edu. This step should be completed by September 12.

Accessing and Completing the CITI Course

1. On a web browser, go to www.citiprogram.org
2. CITI Login and Registration
 - Click on "New Users Register Here"
3. Course Registration
 - Select your institution or organization: Click on the right-hand arrow for a drop-down list for "Participating Institutions" and select **Washington State University**.
 - If you select anything other than Washington State University, your certificate of completion will not be sent to the WSU IRB.
 - Select your Username and Password:
 - Remember to SAVE your username and password for re-entering the course to complete modules, take additional training and/or to print additional certificates.
 - Enter your name
 - Enter your email address
4. Select Curriculum - Washington State University
 - Question 1: Select the Basic Course "**Social and Behavioral Research Investigators**" or "**Biomedical Research**" to satisfy CITI training requirements for WSU IRB. **Note:** These are the only courses that satisfy the WSU IRB training requirement. All other courses are considered supplemental, are optional, and will not be tracked by the ORA.

- Question 2: Select "**I have not completed the Basic Course.**"
 - If you completed the Basic Course and would like to take the Refresher Course, select "Social and Behavioral Research Investigators."
- Question 3: Select only if needed.
- Question 4: Select only if needed.
- 5. Select your institution or organization
 - If Washington State University is chosen, check "No" to continue.
- 6. Learner's Menu
 - Select "Enter" under My Courses to begin training.
 - Complete the eight (8) required modules to satisfy CITI training requirement for WSU IRB.
- 7. Upon completion of the required modules, print the course "Completion Report" for your records and email a copy to reanne.cunningham@wsu.edu. Also, attach "Completion Report" to your application.

WSU Service Learning Project

You will be required to complete 6 hours working with older adults in the real world, or observing health care professionals working with older adults. A staff member from the Center of Civic Engagement will come to class on August 22 to discuss placements that are available through their office and procedures for enrolling through their office. You may also seek out alternate placements with professionals in the community. The goal of the placement is to provide you with an opportunity to observe some of the issues faced by older adults with disabilities in the real world, to assist you in learning about the types of strategies and assistive technologies that the older individuals may be using, and to spark potential ideas for better design development and assistive technologies. Details of the service learning steps are available online at <http://eecs.wsu.edu/~cook/gt1/servicelearning.pdf>.

The Center for Civic Engagement (CCE) offers WSU students, faculty, campus departments, and community partner opportunities to share knowledge, skills, and resources for the benefit of student learning and the well-being of our communities. The CCE facilitates service learning experiences as part of academic curricula and will be working with this class to provide appropriate community-based experiences for students.

You will manage your service learning experience on CougSync (<https://orgsync.com/login/washington-state-university-pullman>). The system tracks your activities and can even provide you with a co-curricular transcript or e-portfolio to show all of the activities you have participated in at WSU. This will be a great resource when applying for jobs or internships! Once CCE has your contact information (we will take care of this on the first day of class), you will receive an email message inviting you to your course portal on CougSync. Log on to CougSync using your WSU network ID and password to access your course space. If you do not receive this email in a timely manner or have any questions please contact a Peer Mentor at the CCE (servicelearning@wsu.edu or 509-335-1661) or visit cce.wsu.edu.

After you complete your placement work, you will write up a report summarizing your observations. This paper is due November 28 by 9am, so please start your placements immediately. Papers are to be submitted to Blackboard by 9am on 11/28. Papers should be no longer than 6 pages double spaced.

Address the following points in your service report:

- Describe three everyday challenges that the individuals/staff you worked with faced.
- For each of the three everyday challenges, describe at least one strategy or compensatory/assistive technology that was being used? If no strategy/technology was being used, comment on what you think the reason for this was.
- For each of the three everyday challenges, describe how well you felt the strategy and or technology was working. Propose at least one additional technology that you believe could provide assistance. If no strategy was being used, propose a strategy or assistive technology that you think would prove helpful for the situation. For each proposed technology, highlight data/articles read/class material that supports its probable success.

Attendance: Class attendance is strongly encouraged. While students may miss class for urgent reasons, absences that are not cleared with the instructors will factor into the Class Participation portion of the semester grade.

Policy Regarding Late Work: Assignments are expected to be emailed by the listed due date and time. However, assignments that are turned in up to one day late will be accepted with a 20% grade penalty and assignments turned in up to two days late will be accepted with a 40% grade penalty. Assignments turned in more than two days late will not be accepted.

Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please either visit the Access Center (Washington Building 217) or call 509-335-3417 to make an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.

Academic Integrity Policy: Academic integrity is the cornerstone of higher education. As such, all members of the university community share responsibility for maintaining and promoting the principles of integrity in all activities, including academic integrity and honest scholarship. Academic integrity will be strongly enforced in this course. Students who violate WSU's Academic Integrity Policy (identified in Washington Administrative Code (WAC) 504-26-010(3) and -404) will fail the assignment, will not have the option to withdraw from the course pending an appeal, and will be reported to the Office of Student Conduct.

Cheating includes, but is not limited to, plagiarism and unauthorized collaboration as defined in the Standards of Conduct for Students, WAC 504-26-010(3). You need to read and understand all of the definitions of cheating: <http://app.leg.wa.gov/WAC/default.aspx?cite=504-26-010>. If you have any questions about what is and is not allowed in this course, you should ask course instructors before proceeding. If you wish to appeal a faculty member's decision relating to academic integrity, please use the form available at conduct.wsu.edu.

Safety Information: Washington State University is committed to maintaining a safe environment for its faculty, staff, and students. Safety is the responsibility of every member of the campus community and individuals should know the appropriate actions to take when an emergency arises. In support of our commitment to the safety of the campus community the University has developed a Campus Safety Plan, <http://safetyplan.wsu.edu>. It is highly recommended that you visit this web site as well as the University emergency management web site at <http://oem.wsu.edu/> to become familiar with the information.

Course Calendar

Date	Topic	Due by 9am
8/22	Syllabus / research methods and expectations Center for Civic Engagement – Service learning	
8/24	Research methodology in aging	Critical question due
8/29	Multi-disciplinary research group proposals Discussion of smart watch data collection Smart watches distributed	
8/31	Technology use and acceptance Review research project choices	Critical question due
9/5	Smart environments Smart home tour	Critical question due Research project choices due
9/7	Ambient sensors and sensor networks	Critical question due Research groups assigned
9/12	Guest speaker , Lorraine Evangelista Diet and exercise interventions	
9/14	Institutional review board Meetings with research teams	Guest speaker summary due
9/19	Guest speaker , Shelly Fritz Clinician in the loop smart homes	Complete AL data collection
9/21	Machine learning	Guest speaker summary due
9/26	Activity learning Meetings with research teams	Critical question due
9/28	Guest speaker , Kathleen Insel Memory and thinking	
10/3	Meet with research teams	Guest speaker summary due
10/5	Aging, senses, and health care	Critical question due
10/10	Aging, senses, and health care	Critical question due
10/12	Guest speaker , Keith Diaz Moore Designing for older adults	Homework assignment due
10/17	Guest speaker , Ka'imi Sinclair Working with reservations	Guest speaker summary due
10/19	Meet with research teams	Guest speaker summary due
10/24	Designing for older adults	Critical question due
10/26	Guest speaker , Don McMahon Training adults with disabilities	
10/31	Student project proposals	Guest speaker summary due Presentation material 9am
11/2	Student project proposals	Presentation material 9am
11/7	Aging, mobility and falls	Critical question due
11/9	Aging, cognition and everyday function	Critical question due
11/14	Guest speaker , Jason Gerstner Sleep, circadian rhythms, learning and memory	
11/16	Aging, cognition and everyday function	Guest speaker summary due Critical question due
11/21 11/23	Thanksgiving	

11/28	Guest speaker , Doug Weeks Monitoring rehabilitation	Service learning report due
11/30	Meet with project teams	Guest speaker summary due
12/5	Service learning discussion Previews of Gerontechnology II	
12/12	Poster session 10:10am in EME 130	Mail posters by 12/10 9am

Reading List (required, unless indicated as optional): Will be updated

8/22

+ Graafmans, J. A. M. (2017). The history and incubation of gerontechnology (pp. 3-11). In S. Kwon (Ed.). *Gerontechnology: Research, Practice and Principles in the Field of Technology and Aging*. Springer Publishing Company, NY. (optional)

8/24

+ Hertzog, C. & Light, L. (2004). Methodological issues in the assessment of technology use for older adults (Chapter 4). In R. W. Pew & S. B. Van Hemel (Ed). *Technology for adaptive aging*, pp 93-127.

8/31

+Tam, J., & Schmitter-Edgecombe, M. (2017). Factors affecting aging services technology use in the aging population. In T. Parsons & R. Kane (Ed.). *The Role of Technology in Clinical Neuropsychology*. Oxford University Press.

9/5

Cook, D. J., Crandall, A. S., Thomas, B. L., & Krishnan, N. C. (2013). CASAS: A Smart Home in a Box. *Computer*, 46(7), 10.1109/MC.2012.328. doi:10.1109/MC.2012.328. Available at <http://eecs.wsu.edu/~cook/pubs/computer12.pdf>.

9/7

Cook, D.J. & Krishnan, N.C. Activity Learning: Discovering, Recognizing, and Predicting Human Behavior from Sensor Data. Wiley, 2015. Chapter 3. Available at http://eecs.wsu.edu/~cook/gt1/papers/AL_Chapter3.pdf.

9/12 Guest Speaker

L. Evangelista, H. Ghasemzadeh, J. Lee, R. Fallahzadeh, M. Sarrafzadeh, and D. Moser. Predicting adherence to use of remote health monitoring systems in a cohort of patients with chronic heart failure. *Technology and Health Care*, 25:425-433, 2017. Available at <http://eecs.wsu.edu/~cook/gt/papers/le1.pdf>.

L. Evangelista, D. Moser, J. Lee, A. Moore, H. Ghasemzadeh, M. Sarrafzadeh, and C. Mangione. Examining older adults' perceptions of usability and acceptability of remote monitoring systems to manage chronic heart failure. *Gerontology & Geriatric Medicine*, January-December 2015:1-6, 2015. Available at <http://eecs.wsu.edu/~cook/gt/papers/le2.pdf>. (optional)

M. Ong et al. Effectiveness of remote patient monitoring after discharge of hospitalized patients with heart failure. *JAMA Intern Med.*, 2016. Available at <http://eecs.wsu.edu/~cook/gt/papers/le3.pdf>. (optional)

L. Evangelista et al. Examining the effects of remote monitoring systems on activation, self-care, and quality of life in older patients with chronic heart failure. *Journal of Cardiovascular Nursing*, 30(1):51-57, 2015. Available at <http://eecs.wsu.edu/~cook/gt/papers/le4.pdf>. (optional)

9/19 Guest Speaker

Fritz, R. and Cook, D.J.. Identifying varying health states in smart home sensor data: An expert-guided approach. *World Multiconference on Systems, Cybernetics and Informatics*, 2017. Available at <http://eecs.wsu.edu/~cook/gt1/papers/sf3.pdf>.

Fritz, R., Corbett, C., Vandermause, R., and Cook. The influence of culture on older adults' adoption of smart home monitoring. *Gerontechnology*, 14(3):146-156, 2016. Available at <http://eecs.wsu.edu/~cook/gt/papers/sf1.pdf>. (optional)

G. Sprint, D.J. Cook, R. Fritz, and M. Schmitter-Edgecombe. Using smart homes to detect and analyze health events. *Computer*, 49(11):29-37, 2016. Available at <http://eecs.wsu.edu/~cook/gt/papers/sf2.pdf>. (optional)

9/21

Cook, D.J. & Krishnan, N.C. Activity Learning: Discovering, Recognizing, and Predicting Human Behavior from Sensor Data. Wiley, 2015. Chapter 4. Available at http://eecs.wsu.edu/~cook/gt1/papers/AL_Chapter4.pdf.

9/26

Cook, D.J. & Krishnan, N.C. Activity Learning: Discovering, Recognizing, and Predicting Human Behavior from Sensor Data. Wiley, 2015. Chapters 2 and 5. Available at http://eecs.wsu.edu/~cook/gt1/papers/AL_Chapter2_5.pdf.

9/28 Guest Speaker

K. Insel et al. Multifaceted prospective memory intervention to improve medication adherence. *JAGS*, 2016. Available at <http://eecs.wsu.edu/~cook/gt1/papers/ki3.pdf>.

K. Insel, J. Lee, G. Einstein, and D. Morrow. Opportunities for technology: Translating an efficacious intervention to improve medication adherence among older adults. In *Human Aspects of IT for the Aged Population*, Springer, 2015. Available at <http://eecs.wsu.edu/~cook/gt1/papers/ki1.pdf>. (optional)

K. Insel, G. Einstein, D. Morrow, and J. Hepworth. A multifaceted prospective memory intervention to improve medication adherence: Design of a randomized control trial. *Contemporary Clinical Trials*, 34:45-52, 2013. Available at <http://eecs.wsu.edu/~cook/gt1/papers/ki2.pdf>. (optional)

10/5

+ Wittich, W., & Gagne, J. P. (2017). Perceptual aspects of gerontechnology (pp. 13-34). In S. Kwon (Ed.). *Gerontechnology: Research, Practice and Principles in the Field of Technology and Aging*. Springer Publishing Company, NY.

10/10

de Barros, A. C., Leitao, R., & Ribeiro, J. (2014). Design and evaluation of a mobile interface for older adults: navigation, interaction and visual design recommendations. *Procedia Computer Science*, 27, 369-378. Available at <http://www.sciencedirect.com/science/article/pii/S187705091400043X>

10/12 Guest Speaker

TBD by guest speaker

10/17 Guest Speaker

TBD by guest speaker

10/24

+ Lim, C. S. C., & Newell, A. F. (2017). User-sensitive inclusive design for technology in everyday life (pp. 157-180). In S. Kwon (Ed.). *Gerontechnology: Research, Practice and Principles in the Field of Technology and Aging*. Springer Publishing Company, NY.

10/26 Guest Speaker

TBD by guest speaker

11/7

Rantz, Marilyn J., et al. "A New Paradigm of Technology-Enabled 'Vital Signs' for Early Detection of Health Change for Older Adults."

Gerontology 61.3 (2015): 281-290. Available at

<http://www.eldertech.missouri.edu/files/Papers/Rantz/A%20New%20Paradigm%20of%20Technology-Enabled%20'Vital%20Signs'.pdf>

11/9

+ Mayhorn, C. B., Rogers, W. A., & Echt., K. V. (2017). Designing technology for older adults: Augmenting usefulness and usability via cognitive support (pp. 389-416). In S. Kwon (Ed.). *Gerontechnology: Research, Practice and Principles in the Field of Technology and Aging*. Springer Publishing Company, NY.

11/14 Guest Speaker

TBD by guest speaker

11/16

Satariano, W. A., Schlach, A. E., & Linderman, D. (2014). Aging, place, and technology: toward improving access and wellness in older populations. *Journal of Aging and Health*, 26, 1373-1389. Available at

http://journals.sagepub.com/doi/abs/10.1177/0898264314543470?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%3dpubmed

11/28 Guest Speaker

G. Sprint, D. Cook, D. Weeks. And V. Borisov. Predicting functional independence measure scores during rehabilitation with wearable inertial sensors. *IEEE Access*, volume 3, 2015.

Available at <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=7194735>.

+must copy or order through interlibrary loan

Books on Gerontology (additional resources)

Kwon, S. (Ed.). *Gerontechnology: Research, Practice and Principles in the Field of technology and Aging*. Springer, 2017.

Lesnoff-Caravaglia, G. (editor). *Gerontechnology: Growing Old in a Technological Society*. Charles C. Thomas, 2007.

Burdick, D. & Kwon, S. (Ed.). Gerotechnology: Research and Practice in Technology and Aging. Springer, 2004.

Harrington, T.L. & Harrington, M.K. Gerontechnology Why and How. Shaker Publishing B.V., 2000.

Taipale, V., Charness, N., & Graafmans, J.A.M. Gerontechnology: A Sustainable Investment in the Future. Ios, 1997.