Gerontechnology II

Spring 2018

Wednesdays 9am-11am, EME 130

Individual group meetings Wednesdays 8am-9am, 11am-12pm in EME 130

Course Instructors

	Maureen Schmitter-Edgecombe	Diane Cook
Office:	JT 312	EME 121
Telephone:	335-0170	335-4985
Office hours:	Fri 10:30 - 12:00	Tu 8:00 – 10:00
Email:	schmitter-e@wsu.edu	djcook@wsu.edu

Course Web Page

The class web page is available at http://eecs.wsu.edu/~cook/gt2. 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.*

Catalog Course Description

Psych 486 / CptS 486 Gerontechnology II 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 continue our introduction to the principles of Gerontechnology, an interdisciplinary field that combines gerontology and technology. The class will consist of lectures, group discussion, guest presentations, homework assignments, and a multi-disciplinary research project. 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 performing research in multi-disciplinary 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	• Research methodology in aging • Human factors • Ethics, acceptance	• Speaker summaries • Critical questions • Homework assignment • Paper presentations • Paper • Poster
Quantitative Reasoning	Grasp properties involved in psychological assessment; grasp methods of sensor-based data collection and analysis	• Sensors • Smart environments • Research methods	• Homework assignment • Speaker summaries • Paper • Poster
Scientific Literacy	Identify issues related to aging, be aware of and understand state-of-the-art research in gerontechnology	• Aging and: senses, health care, mobility, cognition, everyday function • Guest lectures on current research	• Speaker summaries • Paper presentation • Paper • Poster
Information Literacy	Be able to access and utilize literary resources to understand a gerontechnology challenge	• Research methods	• Speaker summaries • Critical questions • Paper presentation • Paper • Poster
Communication	Present the results of a research project orally and in writing	• Research project	• Speaker summaries • Paper presentation • Paper • Poster
Diversity	Be aware of ethical issues related to gerontechnology; understand diversity of cultures in views on aging	• Ethics • IRB discussion	• Speaker summaries • Critical questions
Depth, Breadth, and Integration of Learning	Understand issues related to practical application of technologies to address issues in aging	• Guest lectures on current research • Multi-disciplinary research project	• Speaker summaries • Paper presentation • Paper • Poster

Course Requirements

(1) *Critical Questions and Summaries of Guest Speakers (30%).*
    a. Critical Questions: You will have one required reading for almost all class periods. For those class periods labeled as critical question due, you are to create one question which demonstrates that you have thoughtfully read and evaluated the paper for the class period. Upload this critical question to Blackboard. We will use the questions to enrich classroom discussion about the material.
    b. Summaries: We will bring in 7 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 for 6 of the invited talks, which are labeled in the class calendar. The summaries are due prior to the beginning of the next class period and are to be uploaded to 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 - you must include references to at least two articles that you have read for class as well as discuss class materials
        iii) your ideas about how the speaker's work could be extended in the future

(2) *Homework Assignment (10%).* You will be given one homework assignment to complete. This assignment will involve creating a sensor data collection app and modifying it for enhanced use by older adults. More precise information about the homework assignment is available on the class web page. *The completed homework assignment should be uploaded to Blackboard by 9am on the due date.*

(3) *Paper Presentation (10%).* You will give one presentation to the class during the semester. The presentation will summarize a paper on a Gerontechnology topic for the class and relate the material to discussions we have in class throughout the semester. Your top 3 choices for presentation topics and dates is due by email to reanne.cunningham@wsu.edu by 9am on January 24th.

(4) *Research Project (45%).* Throughout the Gerontechnology II class, you will contribute to an ongoing multi-disciplinary gerontechnology research project. You will present a poster at the end of the semester (4/25) highlighting the project and your contributions and discuss your research results with visitors at the poster session. You will also write a paper and email it to reanne.cunningham@wsu.edu by 9am on 5/2.

(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. Several research team meetings are scheduled throughout the semester. You will be expected to have made progress between each meeting but the meeting is also a time for you to obtain guidance on how to proceed with the project. The research project dates are:

- April 24: 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.
- April 25: Poster session. Discuss the research project, your specific contribution to the team and the project, project results, expected and unexpected challenges, and ideas for future work. This discussion will be conducted in an informal setting for the instructors, fellow students, and visitors.
- May 2: Paper due. You will be asked to write a paper detailing their research project. The paper should be at least 5 pages, 11 point font, with 1 inch margins. The paper should include these sections. The paper will comprise 50% of the research project grade. Email the paper by 9am on the due date to reanne.cunningham@wsu.edu.
    - Project introduction: background, motivation
    - Hypothesis
    - Literature Review
    - Methods
    - Experimental analyses and findings
    - Discussion and Conclusions

Attendance: Weekly 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
1/10	Syllabus, Research team status Health-assistive apps Guest speaker: Dr. David Kutzik	Critical question due
1/17	Sensor app design	Guest speaker summary
1/24	Sensor app design Sensor app lab	Student presentation date / topic choices
1/31	Mild cognitive impairment and dementia	Critical question due
2/7	Mild cognitive impairment and dementia Guest speaker: Dr. David Sprott	Homework assignment due
2/14	Student presentations	Presentation materials due Guest speaker summary
2/21	Student presentations	Presentation materials due
2/28	Ethics and caregiver issues Guest speaker: Dr. Tanzeem Choudhury	Critical question due
3/7	Guest speaker: Dr. Momotaz Begum Health technologies: prevention and intervention	Guest speaker summary due
3/14	Spring Break	
3/21	Behavioral change detection Guest speaker: Dr. Steve Woods	Guest speaker summary due
3/28	Socialization and Caregiver challenges Caregiver panel and visitor: Judy Cornish	Guest speaker summary due
4/4	Audience-adapted visualization Guest speaker: Dr. Troy McDaniel	Guest speaker summary due
4/11	Guest speaker: Gabriela Sanchez Guest speaker: Dr. Naomi Chaytor	Guest speaker summary due
4/18	Chronic health conditions Group meetings	Guest speaker summary due Poster due 4/24 9am
4/25	Poster session	Papers due 5/2 9am

Reading List

1/10
D. Kutzik. Behavioral monitoring to enhance safety and wellness in old age. In Research, Practice, and Principles in the Field of Technology and Aging (S. Kwon, ed.) Springer, 2016. http://eecs.wsu.edu/~cook/gt2/Kutzik_Kwon_Chapter_14.pdf

1/17

1/24
C.-J. Chiu, et al. The attitudes, impact, and learning needs of older adults using apps on touchscreen mobile devices: Results from a pilot study. *Computers in Human Behavior, 36*:189-197, 2016. http://eecs.wsu.edu/~cook/gt2/chiu.pdf

1/31
Korolev, I. O. (2014). Alzheimer's disease: a clinical and basic science review. *Medical Student Research Journal, 4*, 24-33. http://msrj.chm.msu.edu/wp-content/uploads/2014/12/Fall-2014-Alzheimers-Disease.pdf

2/7
Meiland et al. (2017). Technologies to support community-dwelling persons with dementia: a position paper on issues regarding development, usability, effectiveness and cost-effectiveness, deployment, and ethics. *JMIR Rehabilitation and Assistive Technologies, 4*.

2/28
J. Costa et al. (2016). EmotionCheck: Leveraging bodily signals and false feedback to regulate our emotions. *UbiComp*.

Camp. L. J., & Huber, L. L. (2017). Privacy implications of aware, active and adaptive technologies (pp. 99-114). In S. Kwon (Ed.). *Gerontechnology: Research, Practice and Principles in the Field of Technology and Aging*. Springer Publishing Company, NY.

3/7
McCallum, T. J., Agree, E. M., & Coppola, J.F. (2017). Health management, health promotion, and disease prevention in gerontechnology (pp. 351-368). In S. Kwon (Ed.). *Gerontechnology: Research, Practice and Principles in the Field of Technology and Aging*. Springer Publishing Company, NY.

A. Lydakis et al. (2017). A learning-based agent for home neurorehabilitation. International Conference on Rehabilitation Robotics, pages 1233-1238.

3/21
G. Sprint, D. Cook, and M. Schmitter-Edgecombe. Unsupervised detection and analysis of changes in everyday physical activity data. Journal of Biomedical Informatics, 63:54-65, 2016. http://eecs.wsu.edu/~cook/pubs/jbi16.pdf

S. Woods, et al. Household everyday functioning in the Internet age: Online shopping and banking skills are affected in HIV-associated neurocognitive disorders. *Journal of the International Neuropsychological Society, 23*:605-615, 2017. http://eecs.wsu.edu/~cook/gt2/Woods_SmarT_JINS2017.pdf

3/28
Caregiving Topics: Anosognosia (unawareness of decline or difficulties) (required) http://eecs.wsu.edu/~cook/gt2/judy1.pdf

B. Atwood. Representing children who can't or won't direct counsel: Best interests lawyering or no lawyer at all? Arizona Legal Studies Discussion Paper No. 11-16, 2011. (optional) http://eecs.wsu.edu/~cook/gt2/judy2.pdf

E. Germaine. Lawyers' obligations when representing clients with diminished capacity. (optional) http://eecs.wsu.edu/~cook/gt2/judy3.pdf

4/4
S. Panchanathan, S. Chakraborty, T. McDaniel, and R. Tadayon. (2016). Person-centered multimedia computing: A new paradigm inspired by assistive and rehabilitative applications. IEEE Multimedia Magazine, 23(3):12-19. http://eecs.wsu.edu/~cook/gt2/troy.pdf

4/18
Kwon, S. (2017). Synopsis: lessons learned, long-term guidelines and how to live a livable life in old age with likable technologies (pp. 463-484). In S. Kwon (Ed.). *Gerontechnology: Research, Practice and Principles in the Field of Technology and Aging*. Springer Publishing Company, NY.

Books, Journals and Readings to Consider for Presentation

- Gerontechnology: International journal on the fundamental aspects of technology to serve the ageing society. http://gerontechnology.info/index.php/journal/pages/view/journal

- IEEE Conference on Pervasive Computing and Communications. http://percom.org/sites/default/files/PerCom2017-Program.pdf

    o Example papers:

    o Privacy in Context-aware Mobile Crowdsourcing Systems, Thivya Kandappu, Archan Misra, Shih-Fen Cheng, and Hoong Chuin Lau

    o Ethics and Legal Considerations in the Internet of Things, Helaine Leggat

    o SmartCare: An introduction, Gergely Zaruba, Manfred Huber, Nicholas Brent Burns, Kathryn Daniel

- EyeAssist: A communication aid through gaze tracking for patients with neuro-motor disabilities, Anwesha Khasnobish, Rahul Gavas, Debatri Chatterjee, Ved Raj, Sapna Naitam

  - SwallowNet: Recurrent neural network detects and characterizes eating patterns, Dzung Tri Nguyen, Nabil Alshurafa, Eli Cohen

  - Investigating barriers and facilitators to wearable adherence in fine-grained eating detection, Rawan Alharbi et al.

  - A wireless IoT system towards gait detection in stroke patients, ADK Jahangir et al.

- IEEE Journal of Biomedical and Health Informatics. http://jbhi.embs.org/

- Technology and Health Care. http://www.iospress.nl/journal/technology-and-health-care/

- ACM International Joint Conference on Pervasive and Ubiquitous Computing. http://ubicomp.org/ubicomp2017/program/program.html

  - Example papers:

  - PRADO: Predicting app adoption by learning the correlation between developer-controllable properties and user behaviors, Xuan Lu et al.

  - PupilScreen: Using smartphones to assess traumatic brain injury, Alex Mariakakis et al.

  - Predicting symptom trajectories of schizophrenia using mobile sensing, Rui Wang et al.

  - Beyond interruptibility: Predicting opportune moments to engage mobile phone users, Martin Pielot et al.

  - SuperpowerGlass: A wearable aid for the at-home therapy of children with Autism, Peter Washington et al.

  - UbiEar: Bringing location-independent sound awareness to the hard-of-hearing people with smartphones, Sicong Liu et al.

  - Eyes-Free Art: Exploring proxemic audio interfaces for blind and low vision art engagement, Kyle Rector et al.

  - Smartatch wearing behavior analysis: A longitudinal study, Hayeon Jeong et al.

- International Conference on Smart Homes and Health Telematics. http://www.icostconference.org/

- Digital Health Journal. http://dhj.sagepub.com/