



University of Maryland School of Public Health

HLTH 434 - Introduction to Public Health Informatics

Semester: Fall 2019
Section: 0101, 0201
Classroom and Time: 0308, Wednesdays, 4:00 pm – 6:45 pm
Course webpage: elms.umd.edu
Instructor: Sandra L. Saperstein
Office: TBA **Office Hours:** W 3:00-4:00 pm
Email: ssaperst@umd.edu

Course Description: This course provides an overview of the field of public health informatics and how technology, information science, and web and mobile applications can support public health practice and research. Students will understand the technology competency needs of public health professionals and will have interactive experiences with available resources and tools. The course will familiarize students with informatics systems deployed at the national, state, and local levels, including non-traditional systems. Students will also be introduced to the field of consumer health informatics, including aspects related to the design, development, and evaluation of consumer health applications. The benefits and issues of using technology for health will be considered throughout the course.

Course Pre- and Co-requisites: Must have earned a minimum of 60 credits, no pre- or co-requisites

Course Learning Objectives:

Upon completing this course, the student will be able to:

1. Define public health informatics and consumer health informatics
2. Compare and contrast the fields of public health informatics with other informatics fields
3. Describe negative and positive outcomes associated with technology use
4. Understand the informatics competencies for professional effectiveness
5. Demonstrate use of technology for professional competency and efficiency
6. Describe current and evolving US public health surveillance systems
7. Use information technology to support scientific inquiry for public health by locating, accessing, using, and interpreting online health data and information
8. Describe the US health informatics infrastructure at the national, state, and local levels
9. Define EHR and explain how electronic health records can benefit public health
10. Describe the benefits and challenges of electronic health records and an interconnected healthcare
11. Demonstrate ability to create an online survey
12. Understand ethics pertaining to online research and data sharing
13. Demonstrate data visualization strategies to improve communication of health information Describe the basic components of GIS and create a map showing health data
14. Describe how consumers use the Internet for health
15. Discuss the digital divide and describe efforts to address inequities
16. Assess the quality of online applications and websites used by consumers
17. Demonstrate strategies for testing readability of documents
18. Explain the purposes and process of user-centered development and usability testing
19. Demonstrate ability to conduct and document a usability test
20. Describe how health behavior theory has been used in online applications
21. Describe how gamification has been applied to games for health
22. Explain Health 2.0 and its impact on public health practice and research
23. Be familiar with how public health practitioners can benefit from social media use

Program Competencies Addressed in this Course:

The following competencies for the Public Health Science and Behavioral and Community Health are addressed in this course:

1. Identify and define public health problems from ecological and interdisciplinary perspective.
2. Synthesize knowledge to formulate scientific solutions to public health problems.
3. Apply scientific knowledge to inform effective public health policy.

Skills Learned or Reinforced in this Course: Students will develop skills related to the use of technology in public health practice, including strategic use of technology to promote health, use of technology for professional effectiveness, communication, surveillance, information access, and security.

Required Texts and Other Readings: No textbook is required for this class. Current peer-reviewed journal articles, reports, videos, and podcasts will be assigned for each topical area each week.

Required Technology and Other Materials: No technology is required. If you have a laptop, please bring it. At times, you will be asked to access free software, which will require the creation of an account. We will be using Microsoft Office, Adobe Creative Cloud programs (Adobe Spark, Adobe Premiere Rush, Adobe XD), and Tableau. You can download Office 365 and Adobe products from Terppware, and Tableau for Students from the Tableau website (<https://www.tableau.com/>).

Course Communication: Canvas will be used for all communications. Announcements will be sent in the event of class cancellations, room changes, or other reminders as needed.

Course Requirements and Expectations: This class will contain a mix of lecture, discussion, and in-class activities/assignments that will illustrate the informatics concepts covered. The in-class activities/assignments will be a mix of group and individual work. Each week, **prior to class**, you are expected to read the assigned article and post a comment or question about the article on the weekly discussion board. Attendance and participation are critical for you to successfully meet course objectives.

In accordance with university policy, if you are absent for a single lecture due to illness or some form of personal or family emergency, this absence will be considered “excused,” and I will accept a note from you, attesting to the date of the illness/incident, along with an acknowledgement that the information is true. Whenever feasible, you should contact me in advance. Multiple or prolonged absences, and absences that prevent attendance at a scheduled exam will require written documentation from an appropriate health care provider/organization. **Make up exams will be given only when the student has a University-recognized absence. If a quiz or exam is to be missed for a legitimate reason the student must contact me (by email ONLY) PRIOR to the exam.** If an exam is missed due to unforeseen circumstances on the day of the exam, the student must contact me **within 24 hours** of the missed exam. Official documentation of the excuse must be provided. If a student misses an exam for any unauthorized reason he/she will receive a grade of zero for that quiz or exam.

Major Graded Assignments: You will receive grades on two exams (mid-term and final), two shorter assignments (one group and one individual) a multi-component final project, and online discussion boards. ****Note that final examinations are scheduled by the university and often do not occur during typical class days/times. The schedule is provided to students as soon as possible. Students are expected to attend the final exam as scheduled and should plan accordingly. PLEASE DO NOT PLAN END-OF-SEMESTER TRAVEL UNTIL FINAL EXAM SCHEDULE HAS BEEN POSTED.**

BASIC NEEDS SECURITY

If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live and believe this may affect your performance in this course, please visit <http://go.umd.edu/basic-needs> for information about resources the campus offers you and let me know if I can help in any way.

University Course Related Policies:

All University of Maryland-approved course policies are provided at the following website:
<http://www.ugst.umd.edu/courserelatedpolicies.html>

Policy descriptions, resources, and links to official policy documents are provided for:

Academic Integrity: What is cheating? What is plagiarism? What is the Honor Pledge?

Code of Student Conduct: What behavior is prohibited?

Sexual Misconduct: What to do in case of sexual harassment or sexual assault.

Non-Discrimination: Procedures to prohibit discrimination, complaints about discrimination, harassment, and retaliation.

Accessibility: Information about disability support services (DSS) and accommodations.

Attendance, Absences, or Missed Assignments: The student must notify the instructor in a timely manner (typically first week of class). Read this prior to Schedule Adjustment date.

Student Rights Regarding Undergraduate Courses: What should I find in the course syllabus? Am I allowed to see my exams after they are graded?

Official UMD Communication: Use of email, communication with faculty, communication about cancelled class meetings, and weather-related or other urgent notifications.

Mid-Term Grades: Provided for 100 and 200 level courses, and all student athletes.

Complaints About Course Final Grades: Questions about course grades should first be addressed to the course instructor.

Copyright and Intellectual Property: Who owns the work that I produce in class?

Final Exams: Final exams are scheduled by the University.

Course Evaluations: SPH is committed to the use of student course evaluations for improving the student experience, course and curriculum delivery, and faculty instruction.

Campus Resources: ELMS, counseling, learning workshops, tutoring, writing help, questions about graduation, adding or dropping classes, withdrawing from the semester, etc.

Course Procedures and Policies: All assignments are to be uploaded through Canvas. Use Canvas to send email to the instructor. Your emails will be responded to within 24-48 hours of receipt during weekdays. Emails received after 5 on a Friday will be responded to on Monday.

Inclement Weather / University Closings / Emergency Procedures:

In the event that the University has a delayed opening or is closed for an emergency or extended period of time, the instructor will communicate to students regarding schedule adjustments, including rescheduling of examinations and assignments due to inclement weather and campus emergencies. Generally, lecture content and materials will be uploaded. If the university closes on an exam date, the exam will be given in the next class.

Available Support Services:

- Office hours – Wednesdays 3-4 or by appointment
- Campus Resources – <https://education.umd.edu/student-resources/student-campus-resources>
- Campus Counseling and Health Services - <https://studentaffairs.umd.edu/counseling-health>

Grading Procedures:

200 pts **This is Public Health Informatics Group Project:** Each group will choose a topic and complete the multi-component project:

<i>Component</i>	<i>Due Date</i>	<i>Points Available</i>
Part 1 - Project Proposal and Contract	9/10/19	25
Part 2a - Visual Abstract (individual)	9/17/19	25
Part 2b – Literature Review Summary	9/24/19	25
Part 3a – Interview Guides	9/24/19	25
Part 3b – Interview Summary	10/22/19	25
Part 4 – Final video	12/3/19	50
Part 5 – Lessons Learned & Peer Review (individual)	12/4/19	25

100 pts **Midterm examination:** 10/2/19

100 pts **Final examination:** Finals week

50 pts **Design a health department app:** Due 10/16/19. You will work in groups. Your team will use Adobe XD to create an app for a local health department to enable the general public to access restaurant inspection findings in your county. Your app should allow search by restaurant name, zip code, or current location. Ultimately, the user should be able to find the date of the inspection, the overall rating, and specific findings for a restaurant.

50 pts **Use of health app or wearable:** Due 11/20/19. You will use a health app or wearable for one week. You will create a visual journal on an Adobe Spark page consisting of 5 journal entries (each ~150 words) with screenshots describing your experience (description of features used, what you liked/disliked, impact on your behavior), and conclude with a 1-paragraph summary of your experience with any recommendations to improve the app.

50 pts **Discussion board posts:** Weekly written responses to readings on designated discussion boards (no more than 250 words). Each is worth 5 points and you can earn up to 50 points. There are 11 discussion boards, with only 10 counting toward your grade so you can miss one and still earn full credit. No bonus points awarded for completing 11.

Late Assignments: If you miss a Homework Assignment or Final Project deadlines, your grade will be reduced by 10% for each day. If it is not turned in after two days have passed, you will be assigned a grade of 0 points.

Final grades are based on the points earned out of the available 550 points described above. Final grades will be assigned based on the following:

PERCENTAGE of points earned	Final grade	PERCENTAGE of points earned	Final grade
97-100	A+	73-76	C
93-96	A	70-72	C-
90-92	A-	67-69	D+
87-89	B+	63-66	D
83-86	B	60-62	D-
80-82	B-	59% and lower	F
77-79	C+		

Please Note:

- Final grades with a .5% or higher will be rounded up; those with a .4% will be rounded down.
- **There will be NO grade negotiation.**

Course Outline / Course Calendar

Course Schedule Summary			
Session	Date	Topic	Assignments
1	8/28	<ul style="list-style-type: none"> Class Survey: https://goo.gl/forms/ucsGATmcnN9kCkRv1 Course Overview – What is public health informatics Negatives and positives of technology use 	<ul style="list-style-type: none"> Discussion Board - Introduce yourself infographic
2	9/4	<ul style="list-style-type: none"> Informatics competencies Databases for Public Health Effective Searching RSS 	<ul style="list-style-type: none"> Discussion Board Form Project Groups
3	9/11	<ul style="list-style-type: none"> Data sources and surveillance systems, including EHRs Citizen Scientists Community Health Profile 	<ul style="list-style-type: none"> Discussion Board Final Project Part 1 due 9/10/19
4	9/18	<ul style="list-style-type: none"> PHI Infrastructure Explore State and Local PH online presence Design an App Group Assignment 	<ul style="list-style-type: none"> Discussion Board Final Project Part 2a due 9/17/19
5	9/25	<ul style="list-style-type: none"> EHR Interoperability/Standards/Security 	<ul style="list-style-type: none"> Discussion Board Final Project Part 2b/3a due 9/24/19
6	10/2	• Midterm	
7	10/9	<ul style="list-style-type: none"> Online Surveys 	<ul style="list-style-type: none"> Discussion Board
8	10/16	<ul style="list-style-type: none"> Data Visualization 	<ul style="list-style-type: none"> Discussion Board Design-an-App Assignment due 10/15/19
9	10/23	<ul style="list-style-type: none"> GIS Mapping 	<ul style="list-style-type: none"> Discussion Board Final Project Part 3b Findings due 10/22/19
10	10/30	<ul style="list-style-type: none"> Intro to Consumer Health Informatics Digital divide Readability 	<ul style="list-style-type: none"> Discussion Board Start your 1-week experience with a health app or wearable
11	11/6	<ul style="list-style-type: none"> User-Centered Design 	<ul style="list-style-type: none"> Discussion Board
12	11/13	<ul style="list-style-type: none"> Behavior change applications and health behavior theory Tailoring Gamification 	<ul style="list-style-type: none"> Discussion Board
13	11/20	<ul style="list-style-type: none"> Health 2.0 	<ul style="list-style-type: none"> Use of health app or wearable summary due 11/19/20
	11/27	HAPPY THANKSGIVING!	
14	12/4	<ul style="list-style-type: none"> This is Public Health Informatics video show Course wrap-up and review 	<ul style="list-style-type: none"> Final Project Part 4 Video due 12/3/19 Part 5 Lessons Learned/Peer Review due 12/4/19
	TBA	Final Examination – schedule (day/time) to be announced.	

Session Outline	
Session 1	8/28/19
Topic: Course Overview – Introduction to Public Health Informatics	
Learning Objectives for Session	
<ol style="list-style-type: none"> 1. Define public health informatics and consumer health informatics 2. Compare and contrast the fields of public health informatics with other informatics fields 3. Describe negatives and positives associated with technology use 	
Required readings	
<ul style="list-style-type: none"> • Baker, E.L., Fond, M., Hale, P., Cook, J. (2016). What is “Informatics”? <i>Journal of Public Health Management and Practice</i>, 22, 420-423, https://doi.org/10.1097/PHH.0000000000000415 • Podcast: How to explain Informatics to your family and friends. Available: https://phii.org/blog/explaining-informatics 	
In-Class Activities	
<ul style="list-style-type: none"> • Class survey - https://forms.gle/YDvmSbZVGMWYwYRdS9 • Start your infographic 	
Assignments	
<ul style="list-style-type: none"> • Introduce Yourself Discussion Board with Infographic 	
Session 2	9/4/19
Topics: Competencies/Databases for Public Health/Effective Searching/RSS Feeds	
Learning Objectives for Session	
<ol style="list-style-type: none"> 4. Understand the informatics competencies for professional effectiveness 5. Demonstrate use of technology for professional competency and efficiency 	
Required readings	
<ul style="list-style-type: none"> • O’Carroll, P. W. (2002). Informatics Competencies for Public Health Professionals. Seattle. Retrieved from www.nwcp.org/phi/comps/ • Public Health Research Guide – Searching Strategies, http://lib.guides.umd.edu/PublicHealth/searching 	
In-Class Activities	
<ul style="list-style-type: none"> • Form final project groups. Work on Part 1. • Search assignment • Set up RSS reader 	
Assignments	
<ul style="list-style-type: none"> • Discussion Board 	
Session 3	9/11/19
Topics: Data sources and surveillance systems, including EHR/Citizen Scientists/Infographics	
Learning Objectives for Session	
<ol style="list-style-type: none"> 6. Describe current and evolving US public health surveillance systems 7. Use information technology to support scientific inquiry for public health by locating, accessing, using, and interpreting online health data and information 	
Required readings	
<p>Smolinski, M. S., Crawley, A. W., Baltrusaitis, K., Chunara, R., Olsen, J. M., Wójcik, O., ... Brownstein, J. S. (2015). Flu Near You: Crowdsourced Symptom Reporting Spanning 2 Influenza Seasons. <i>American Journal of Public Health</i>, 105(10), 2124–2130. http://doi.org/10.2105/AJPH.2015.302696</p>	
In-Class Activities	
<ul style="list-style-type: none"> • Community Health Profile Activity 	
Assignments	
<ul style="list-style-type: none"> • Discussion Board • Final Project Part 1 Proposal and Contract due 	

Session 4	9/18/19
Topics: Understanding the PHI infrastructure at national, state, and local levels	
Learning Objectives for Session	
8. Describe the US health informatics infrastructure at the national, state, and local levels	
Required readings	
Edmunds, M. (2014). Public Health Informatics and Information Systems. In J. A. Magnuson & J. P. C. Fu (Eds.), <i>Public Health Informatics and Information Systems</i> (pp. 47–66). London: Springer-Verlag. http://doi.org/10.1007/978-1-4471-4237-9_4	
Public Health Informatics Institutes: Podcast: NYC Macroscope, EHRs and population health surveillance. Available: https://www.phii.org/blog/podcast-nyc-macroscope-ehrs-and-population-health-surveillance	
In-Class Activities	
<ul style="list-style-type: none"> • Design an app for a local health department 	
Assignments	
<ul style="list-style-type: none"> • Discussion Board • Final Project Part 2a 	
Session 5	9/25/19
Topics: Electronic Health Records/Interoperability, Standards, Security/Personal Security	
Learning Objectives for Session	
9. Define EHR and explain how electronic health records can benefit public health	
10. Describe the benefits and challenges of electronic health records and an interconnected healthcare system	
11. Describe how standards, interoperability, & security affect the development of an interconnected system	
Required readings	
Birkhead, G. S., Klompas, M., & Shah, N. R. (2015). Uses of Electronic Health Records for Public Health Surveillance to Advance Public Health. <i>Annual Review of Public Health</i> , 36(1), 345–359. http://doi.org/doi:10.1146/annurev-publhealth-031914-122747	
Public Health Informatics Institutes: Podcast: Chicago's demonstration project for STI electronic case reporting. Available: http://phii.org/blog/podcast-chicagos-demonstration-project-sti-electronic-case-reporting	
In-Class Activities	
<ul style="list-style-type: none"> • TBA 	
Assignments	
<ul style="list-style-type: none"> • Discussion Board • Final Project Part 2b Literature Review Summary and Part 3a Interview Guides due 	
Session 6	10/2/19
Midterm	
Session 7	10/9/19
Topics: Creating an online survey	
Learning Objectives for Session	
12. Demonstrate ability to create an online survey	
13. Understand ethics pertaining to online research and data sharing	
Required readings	
Surveys101. https://www.surveymonkey.com/mp/survey-guidelines/	
In-Class Activities	
<ul style="list-style-type: none"> • Develop and pretest an online survey 	
Assignments	
<ul style="list-style-type: none"> • Discussion Board • 	
Session 8	10/16/19
Topics: Data Visualization	

Learning Objectives for Session	
14. Demonstrate data visualization strategies to improve communication of health information	
Required readings	
Arcia, A., Suero-Tejeda, N., Bales, M. E., Merrill, J. A., Yoon, S., Woollen, J., & Bakken, S. (n.d.). Sometimes More Is More: Iterative participatory design of infographics for engagement of community members with varying levels of health literacy. http://doi.org/10.1093/jamia/ocv079	
In-Class Activities	
<ul style="list-style-type: none"> • Make a word cloud • Make Excel charts 	
Assignments	
<ul style="list-style-type: none"> • Discussion Board • Design an App Assignment due 	
Session 9	10/23/19
Topics: Geographical Information Systems	
Learning Objectives for Session	
15. Describe the basic components of GIS and create a map using Google Fusion	
Required readings	
Smith ML, Towne SD, Herrera-Venson A, et al (2018). Deliver of Fall Prevention Interventions for At-Risk Older Adults in Rural Areas: Findings from a National Dissemination. <i>Int J Environ Res Public Health</i> . 10;15(12). doi: 10.3390/ijerph15122798.	
In-Class Activities	
<ul style="list-style-type: none"> • Make maps with Tableau 	
Assignments	
<ul style="list-style-type: none"> • Discussion Board • Final Project Part 3b Interview Summary due 	
Session 10	10/30/19
Topics: Intro to Consumer Health Informatics/Digital Divide/Readability	
Learning Objectives for Session	
16. Describe how consumers use the Internet and technology for health	
17. Discuss the digital divide and describe efforts to address inequities	
18. Assess the quality of online applications and websites used by consumers	
19. Demonstrate strategies for testing readability of documents	
Required readings	
Castro-Sánchez, E., Spanoudakis, E., & Holmes, A. H. (2015). Readability of Ebola Information on Websites of Public Health Agencies, United States, United Kingdom, Canada, Australia, and Europe. <i>Emerging Infectious Diseases</i> , 21(7), 1217–1219. http://doi.org/10.3201/eid2107.141829	
Pew Research Center. (2018) Fact Sheets. http://www.pewinternet.org/fact-sheet/	
In-Class Activities	
<ul style="list-style-type: none"> • Assessing quality • Assessing readability 	
Assignments	
<ul style="list-style-type: none"> • Discussion Board • Start your behavior change app assignment 	
Session 11	11/6/19
Topics: User-centered design/Usability testing	
Learning Objectives for Session	
20. Explain the purposes and process of user-centered development and usability testing	
21. Demonstrate ability to conduct and document a usability test	

Required readings Boudreaux, E. D., Fischer, A. C., Haskins, B. L., Saeed Zafar, Z., Chen, G., & Chinai, S. A. (2016). Implementation of a Computerized Screening Inventory: Improved Usability Through Iterative Testing and Modification. <i>JMIR Human Factors</i> , 3(1), e10. http://doi.org/10.2196/humanfactors.4896	
In-Class Activities • Usability testing	
Assignments • Discussion Board	
Session 12	11/13/19
Topics: Behavior change apps /Tailoring/Gamification	
Learning Objectives for Session 22. Describe how health behavior theory has been used in online applications 23. Describe how gamification has been applied to games for health	
Required readings West, J. H., Hall, P. C., Arrendondo, V., Berrett, B., Guerra, B., Farrell, J. (2013) Health behavior theories in diet apps. <i>Journal of Consumer Health on the Internet</i> , 17, 1, 10-24. doi: http://dx.doi.org/10.1080/15398285.2013.756343 Althoff T, White RW, Horvitz E. Influence of Pokémon Go on Physical Activity: Study and Implications. <i>J Med Internet Res</i> 2016;18(12):e315. DOI: 10.2196/jmir.6759 Office of Behavioral and Social Science Research. Social and Behavioral Theories, Chapter 4. Available: http://www.esourceresearch.org/eSourceBook/SocialandBehavioralTheories/4ImportantTheoriesandTheirKeyConstructs/tabid/730/Default.aspx	
In-Class Activities • Using powerpoint to create a prototype app or game	
Assignments • Discussion Board	
Session 13	11/20/19
Topics: Health 2.0 and Social Media	
Learning Objectives for Session 24. Explain Health 2.0 and its impact on health and research	
Required readings Scott KK, Errett NA. (2017). Content, Accessibility, and Dissemination of Disaster Information via Social Media During the 2016 Louisiana Floods. <i>J Public Health Manag Pract</i> , 24, 4: 370-379. doi: 10.1097/PHH.0000000000000708	
Assignments • Behavior change app critique due • Discussion Board	
Happy Thanksgiving!	11/27/19
Session 14	12/4/19
Topics: Class Wrap-Up	
In-Class Activities • Watch videos	
Assignments • Final Project Part 4 Video and Part 5 Lessons Learned and Peer Evaluation due	

Additional Literature, Websites and Other Resources:

- Purdue Online Writing Lab – APA Formatting and Style Guide: <https://owl.english.purdue.edu/owl/resource/560/01/>
- Public Health Informatics Institute – Non-profit organization that is focused on establishing informatics as an established public health discipline: <http://phii.org/>
- Journal of Medical Informatics Research - <https://www.jmir.org/> - Prominent open-source journal. Also has sister journals including JMIR Public Health and Surveillance, JMIR mHealth and uHealth, and JMIR Serious Games.