UNC Charlotte
College of Health and Human Services & School of Data Science
HCIP 6250 Capstone: Problem Solving in Healthcare Analytics
Spring 2023

Course Number   HCIP 6250

Course Title   Capstone: Problem Solving in Healthcare Analytics

Course Credit   3 Graduate Credits

Pre-requisites   HCIP 6400 or HADM 6400 or HLTH 6471

Course Day/Time   Tuesdays 5:30 – 8:15 pm (January 9 – May 2)

Course Location   Online Synchronous (& CHHS 133)

Faculty

Michael Dulin (he/him/himself)
Professor, Public Health Sciences
Affiliate Faculty, School of Data Science
E-mail: mdulin3@uncc.edu

Teaching Assistant
Akhilesh Pothuri
apothuri@uncc.edu

Virtual Office Hours: Thursdays 3-4 pm and by appointment
Questions will also be answered by email – please give me 24-48 hours to respond.
Zoom ID # 810 884 0932

Catalog Course Description

A capstone course with synthesis and application of strategic planning, information technology, and analytic concepts via 'real world' consultative projects grounded in health informatics and analytics.

Course Overview and Goals

This course serves as the capstone for the Master of Public Health (MPH) in Population Health Analytics and the Master of Science in Health Informatics and Analytics programs. It is designed to demonstrate and enhance the skills students have learned throughout the program to curate, integrate and visualize personal health data. The course will also prepare students to enter into/advance within the professional workforce.

Each functional area (e.g., informatics, analytics, data interpretation, and reporting) is critical to the population health/healthcare decision processes that these data inform.

The goals of this course are to ensure students can: (1) address health questions with an appropriate approach; (2) extract, analyze, and curate health data; (3) code and analyze data to answer a given health related question or provide insight; (4) interpret, visualize, and communicate analytic results in a meaningful way; (5) work as a team using project management tools; and (5) prepare to enter the professional workforce.

Course Conduct

This capstone class emphasizes team projects as well as to addresses related professional skills that prepare students to enter into/advance within the health/healthcare professional workforce. Each week during our allotted class time, we will work on and discuss the capstone project and progress within each team.

Student Learning Outcomes

After successfully completing this course, students should be able to:

1. Formulate a health question that can be answered using personal health data;
2. Understand how to extract primary health data from a monitoring device (eg fitbit, apple watch, smart phone, etc)
3. Curate multiple data streams from a personal device – including data profiling, imputation, and data integration;
4. Conduct a meaningful analysis and visualization of the data;

5. Demonstrate use of open-source tools (eg Python/R) as well as commonly used proprietary tools for visualization (eg Power BI)
6. Perform effectively on a team using fundamentals of project management.
7. Demonstrate effectiveness in organizing, synthesizing, and articulating the interpretation of an analysis;
8. Demonstrate ability to effectively develop a professional CV and LinkedIn profile;
9. Show ability to respond to a job announcement and interview for a position.

Assessments

Course assessments fall into 4 major domains:

(1) Project #1 - Data curation / profiling (35%)

(2) Project #2 – Data analysis and visualization (35%)

(3) Project Management / Team work (20 %)

(4) Professional Development / Job Readiness (10%)

Students will work in assigned teams of 3 to 4 students and engage in 2 projects.

Project 1 (Week 1-7) will require extraction of 3 or more health metrics from a personal health device(s), then the team must profile, curate, and integrate the data using open-source data tools Python/R. Plan for data extraction and curation will need to occur concurrently with data collection.

- Outcome 1 – Approach for Data Extraction/Curation: 10%
- Outcome 2 – Methods & Results: 10%
- Outcome 3 – Oral Presentation (March 7th): 15%

Project #2 (Week 9 – 14). will analyze and visualize the data collected and curated from project #1 to provide personal health insights.

- Outcome 1 – Approach for Analysis/Visualization: 10%
- Outcome 2 – Methods & Results: 10%
- Outcome 3 – Oral Presentation (April 18th): 15%

Project Management / Team Work (20%)

All members in each team should contribute equally to the project, and a single team submission should be made on behalf of all individuals in the team for both projects. Please be responsible and respectful of your peers and make sure you contribute to the work distribution equally. At the end of each project assignment, include a list of the contributions made by each team member. Confidential peer and self-evaluations will be submitted via survey including:
- Each team member's contributions;
- Challenges with the team dynamics and how these were overcome;
- Positive attributes of each team member;
- Your self-evaluation;

Peer (and self) evaluations are due prior to the project presentations.

Please contact me if you perceive inequalities in the workload that each team member is contributing, or if the team dynamics are not functional.

Professional Development / Job Readiness

During the course you will need to submit a cv and your LinkedIn profile for review.
You are encouraged to connect online with your project team members and provide a positive review if appropriate.

Grading

This course uses the standard graduate decile grading system:
    A = 90-100; B = 80-89; C = 70-79; U = below 70.

Late Assignment Policy

Any late assignment will incur a 5-point deduction for each day it is late unless there is a documented and excused extenuating circumstance. ***Pease contact me if you or your team is/are unable to meet a due date and we can discuss a reasonable extension.***

Class Attendance

Class attendance will be required for project presentations – March 7th and April 18th.

I will provide information a week in advance about additional class attendance as well as if class with by occurring virtually.

Do not come to class if you are not feeling well. Please protect your health and the health of others by staying home.

For prevention of COVID-19, please adhere to the following:

Masks:

It is the current policy of UNC Charlotte that as a condition of on-campus enrollment, all students are required to engage in safe behaviors to avoid the spread of COVID-19 in the 49er community. Such behaviors specifically include the requirement that all students properly wear CDC-compliant face coverings in all indoor spaces on campus, including classrooms and labs, regardless of vaccination status. Failure to comply with this policy in the classroom or lab may result in dismissal from the current class session. If the student refuses to leave the classroom or lab after being dismissed, the student may be referred to the Office of Student Conduct and Academic Integrity for charges under the Code of Student Responsibility.

To clearly set forth a policy on absenteeism during COVID-19:

Students are expected to attend every class and remain in class for the duration of the session when it is safe to do so in accordance with university guidance regarding COVID-19. Failure to attend class or arriving late may impact your ability to achieve course objectives which could affect your course grade. An absence, excused or unexcused, does not relieve a student of any course requirement. Regular class attendance is a student's obligation, as is a responsibility for all the work of class meetings, including tests and written tasks. Any unexcused absence or excessive tardiness may result in a loss of participation points.

Students are encouraged to work directly with their instructors regarding their absence(s). For absences related to COVID-19, please adhere to the following:

- **Complete your Niner Health Check each morning.**

- **Do not come to class if you are sick. Please protect your health and the health of others by staying home. Contact your healthcare provider if you believe you are ill.**

- **If you are sick: If you test positive or are evaluated by a healthcare provider for symptoms of COVID-19, indicate so on your Niner Health Check to alert the University. Submit a copy of your Niner Health Check notification email to your instructors. Upon learning that you have tested positive or have been diagnosed for symptoms of COVID-19, either from your reporting or from Student health Center testing or diagnosis, representatives from Emergency Management and/or the Student Health Center will follow up with you, and your instructors will be notified of the need for accommodations, as necessary.**

- **If you have been exposed to COVID-19 positive individuals and/or have been notified to self-quarantine due to exposure, indicate so on your Niner Health Check to alert the University. Representatives from Emergency Management and/or the Student Health Center will follow up with you as necessary. Submit a copy of your Niner Health Check notification email to your instructors. If you need any additional support verifying your absence after you have communicated with your professors, contact Student Assistance and Support Services.**

To return to class after being absent due to a period of self-quarantine, students should submit a copy of their Niner Health Check clearance email to their instructor(s). To return to class after being absent due to a COVID-19 diagnosis, students should submit an online request form to Student Assistance and Support Services (SASS). Supporting documentation can be attached directly to the request form and should be from a student's

health care provider or the Student Health Center, clearly indicating the dates of absences and the date the student is able to return to class. Instructors will be notified of such absences.

If you are absent from class as a result of a COVID-19 diagnosis or quarantine, as instructor I will work with you to help you continue to make progress in the course.

You can follow along in Canvas with any materials you may miss due to absences; and, please also contact me and/or your teammates for any additional materials you may miss during the class, as well as if you have any questions while you are away.

Students should check their UNC Charlotte email and course Canvas site regularly during the semester.

Due Dates

Due dates for course assignments/assessments/milestones will be posted in the Canvas course site and communicated during our class time (please also see the course schedule below). Plan your time accordingly. Typically, completing a capstone project requires about 9-10 hours per week devoted to the project. Often, students need to contribute more.

Please contact me as soon as possible if you do not think you will be able to submit an assignment on time due to extenuating circumstances.

Required Readings

All capstone/consulting projects require additional reading. Some such resources will be identified at the outset of the project and posted to the Canvas course site, in addition to being supplemented, as needed, throughout the semester. However, there may be additional readings that you will need to identify based on your backgrounds and the identified project topic.

Supplemental Resources

The faculty have identified the following resources as broadly useful to all students:

Your Statistical Consultant: Answers to Your Data Analysis Questions, Second Edition, Rae R. Newton and Kjell E. (Erik) Rudestam, Sage Publications, 2012 (ISBN-13: 978-1412997591)

Public Health Writing Guide:

https://populationhealthexchange.org/teph-public-health-writing-guide

R Statistical Computing (also contains helpful resources/text recommendations): https://www.r-project.org

Nonparametric Statistics for Health Care Research: Statistics for Small Samples and Unusual Distributions, Second Edition, Marjorie A. Pett, Sage Publications, 2015 (ISBN-13: 978-1452281964)

Methods: Toward a Science of Behavior and Experience, Tenth Edition, William J. Ray, Wadsworth, 2012 (ISBN-13: 978-1111521158)

Statistics website: http://onlinestatbook.com

Prohibition of Recordings During Class Meetings

Electronic video and/or audio recording is not permitted during class unless the student obtains permission from the instructor. If permission is granted, any distribution of the recording is prohibited. Students with specific electronic recording accommodations authorized by the Office of Disability Services do not require instructor permission; however, the instructor must be notified of any such accommodation prior to recording. Any distribution of such recordings is prohibited.

Relevant University, College, & Course Policies

College of Health & Human Services Laptop Policy

ALL STUDENTS, graduate and undergraduate, taking CHHS courses, are required to possess a laptop with webcam and microphone. Our courses may require a laptop or other compliant device for in-class assignments. Please note that Chromebooks won't satisfy this policy. NinerTech offers compliant models at student discounted pricing that may represent a savings over regular commercial purchase.

Students may avail themselves of loaner equipment such as that provided via Atkins Library, but should not rely on that option for all of their computing needs.

Course Credit Workload

This 3-credit graduate course requires 3 hours of classroom or direct faculty instruction and at least 6 hours of out-of-class student work each week for approximately 15 weeks. Out-of-class work may include but is not limited to: required reading, analyses, library research, written assignments, preparing for presentations, etc.

Code of Student Responsibility (taken directly from the introductory statement on the UNC Charlotte brochure about the Code of Student Responsibility)

The UNC Charlotte Code of Student Responsibility (the Code) sets forth certain rights and responsibilities in matters of student discipline. The Code defines these responsibilities and guarantees you certain rights that ensure your protection from unjust imposition of disciplinary penalties. You should familiarize yourself with the provisions and procedures of the Code. The entire Code may be found at: https://legal.uncc.edu/policies/up-406.

Academic Integrity

All students are required to read and abide by the Code of Student Academic Integrity. Violations of the Code of Student Academic Integrity, including plagiarism, will result in

disciplinary action as provided in the Code. Students are expected to submit their own work, either as individuals or contributors to a team assignment. Definitions and examples of plagiarism and other violations are set forth in the Code. The Code is available from the Dean of Students Office or online at: https://legal.uncc.edu/policies/up-407 (or see the following for the pdf version: https://legal.uncc.edu/sites/legal.uncc.edu/files/media/2019-08-05_UP-407-CodeOfStudentAcademicIntegrity-APPROVED.pdf).

Faculty may ask students to produce identification at examinations and may require students to demonstrate that graded assignments completed outside of class are their own work.

Particularly in a class such as this which involves a good deal of writing and citing researchers' work, be very careful regarding plagiarism, as this has been an issue in this class in prior semesters. Plagiarism can refer to not citing content from other publications as well as not citing them appropriately. For example, you cannot copy and paste a sentence from another publication and then provide the citation unless you place that sentence in quotations or italicize it and specify that it is taken directly from the identified citation, etc. However, it's generally best practice to paraphrase content from other references rather than using word-for-word exerts in quotations. If you have any questions about citations and/or plagiarism, please do not hesitate to reach out and ask me.

Diversity, Equity, & Inclusion

UNC Charlotte strives to create an academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

The College of Health & Human Services values human diversity in all its richly complex and multi-faceted forms, whether expressed through, but not limited to, race and ethnicity, culture, political and social views, religious and spiritual beliefs, language and geographic characteristics, gender, gender identities and sexual orientations, learning and physical abilities, age, and social or economic classes. It is the intent of CHHS that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength, and benefit. For more information on diversity and inclusion please visit diversity.charlotte.edu.

UNC Charlotte's Official Notice of Nondiscrimination (taken directly from the Office of Legal Affairs)

UNC Charlotte seeks to promote a fair, humane and respectful environment for its faculty, staff, students, contractors and visitors. The University prohibits discrimination and harassment on the basis of race, color, religion, age, national origin, physical or mental disability, political affiliation, veteran status, genetic information, sex, sexual

orientation, gender expression, or gender identity in its programs and activities, and in its employment and educational decisions.

Special Accommodations (Taken directly from UNC Charlotte's Office of Disability Services)

UNC Charlotte is committed to access to education. If you have a disability and need academic accommodations, please send me your accommodation letter as early as possible. You are encouraged to meet with me to discuss the accommodations outlined in your letter. For more information on accommodations, contact the Office of Disability Services at 704-687-0040, disability@uncc.edu, or Fretwell 230 (on campus).

Religious Accommodation

It is the obligation of students to provide faculty with reasonable notice of the dates of religious observances on which they will be absent by submitting a Request for Accommodation for Religious Observance form (https://legal.uncc.edu/sites/legal.uncc.edu/files/media/UP409-ReligiousAccommodationForStudents.pdf) to their instructor prior to the census date for enrollment for a given semester (http://legal.uncc.edu/policies/up-409). The census date for each semester (typically the tenth day of instruction) can be found in UNC Charlotte's Academic Calendar (https://registrar.uncc.edu/printable-calendar).

Names & Pronouns

Many individuals have and/or use preferred names in daily life that are different from their legal name. In this class, we seek to refer to individuals by their preferred names. Pronouns can also be a way to affirm someone's gender identify: pronouns are a public way in which people are referred to in place of their name (e.g., he, she, they, etc.). In this class, you are invited (if you would like) to share your preferred name and/or pronouns, and we seek to refer to individuals using their preferred names and pronouns that they share. Please refer to the University's Office of Identity, Equity, & Engagement (https://identity.uncc.edu) for more details.

Title IX Reporting Obligations Regarding Incidents of Sexual Harassment, Sexual Assault, Dating Violence, Domestic Violence, or Stalking:

UNC Charlotte is committed to providing an environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic violence, dating violence, and stalking. If you (or someone you know) has experienced or experiences any of these incidents, know that you are not alone. UNC Charlotte has staff members trained to support you in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, helping with legal protective orders, and more.

Please be aware that many UNC Charlotte employees, including all faculty members, are considered responsible employees who are required to relay any information or reports of sexual misconduct they receive to the Title IX Coordinator. This means that if you tell me about a situation involving sexual harassment, sexual assault, dating violence, domestic violence, or stalking, I must report the information to the Title IX Coordinator. Although I have to report the situation, you will still have options about how your case will be handled, including whether or not you wish to pursue a formal complaint. Our goal is to make sure you are aware of the range of options available to you and have access to the resources you need.

If you wish to speak to someone confidentially, you can contact any of the following on-campus resources, who are not required to report the incident to the Title IX Coordinator: (1) University Counseling Center (counselingcenter.uncc.edu, 7-0311); (2) Student Health Center (studenthealth.uncc.edu, 7-7400); or (3) Center for Wellness Promotion (wellness.uncc.edu, 7-7407). Additional information about your options is also available at titleix.uncc.edu under the "Students" tab.

You may read more at the following link, which also includes information for reporting misconduct (including Title IX): https://legal.uncc.edu/policies/up-501. Please also see: Clery Center/Campus SaVE and IPV Resource Guide.

All students are required to abide by the UNC Charlotte Sexual Harassment Policy (http://legal.uncc.edu/policies/up-502) and the policy on Responsible Use of University Computing and Electronic Communication Resources (https://itservices.uncc.edu/iso/standard-responsible-use). Sexual harassment, as defined in the UNC Charlotte Sexual Harassment Policy, is prohibited, including when carried out through computers or other electronic communications systems, including course-based chat rooms or message boards.

Last Date of Attendance
The United States Department of Education requires UNC Charlotte's Office of Financial Aid to determine if a student who receives financial aid and fails to earn a passing grade in a course has actually attended and/or completed the course. Because I do not take regular attendance for this course, the date I will report as your last date of attendance will be the latest of the following:
- The date you last submitted an assignment;
- The date you last participated in an in-class, phone, or online discussion/activity; or
- The date you last initiated contact with me to ask a question about the course or course content.

If you earn a U grade, your last date of attendance will be reported to the United States Department of Education. This may require you to pay back any financial

aid funds received for this course. For additional information, see Last Date of Attendance FAQs (https://registrar.uncc.edu/gradingholds/last-date-attendance/last-date-attendance-faqs) on the Registrar's website.

Final Grade Appeal Policy
The university has a policy and procedure for student appeals of final course grades, which can be found at: https://legal.uncc.edu/policies/up-410.

Available University Resources

University Writing Resources Center

For those of you who may need or wish to seek assistance with improving your writing, I encourage you to visit the University Writing Resources Center (WRC) for free tutoring and assistance (they have both face-to-face and e-visits). Since assignments will also contain grading on writing/grammar/spelling, then I encourage you to visit the WRC if you have any questions about your writing prior to submission deadlines. To learn more, visit their website: https://writing.uncc.edu/writing-resources-center.

Atkins Library Research Help Desk

The Atkins library also has resources available to guide you when conducting research throughout your capstone project. To learn more, visit their website: https://library.uncc.edu/research-write/get-research-help/research-help-desk.

Counseling Center

Graduate school, and life experiences outside of graduate studies, can be stressful at times. It is common for students to experience challenges that may interfere with academic success such as academic stress, sleep problems, juggling responsibilities, life events, relationship concerns, or feelings of anxiety, hopelessness, or depression. If you or a friend is struggling, we strongly encourage you to seek support. Helpful, effective resources are available on campus at no additional cost. You may find it helpful to chat with someone at the University's Center for Counseling and Psychological Services (CAPS) (https://caps.uncc.edu), which is free for students. CAPS is staffed with qualified professional counselors who are trained to support and guide students through difficult transitions, experiences, and feelings. Please do not hesitate to contact them any time:

- Phone Number: 704-687-0311
- Location: The office is located in the Christine F. Price Center for Counseling & Psychological Services (CAPS) – behind the Student Health Center (corner of Mary Alexander Rd. & Cameron Blvd.)
- Office Hours: Monday - Friday 8 am - 5 pm, with evening hours available by appointment
  - For emergencies after hours, you can call Campus Police & Public Safety (704-687-2200).

If you are struggling academically with this class, please visit me during office hours or contact me by email at mdulin3@uncc.edu

Meet with your academic advisor if you are struggling academically in multiple classes, unsure whether you are making the most of your time at UNC Charlotte, or unsure what academic resources are available at UNC Charlotte.

Safety and Security Information: UNC Charlotte's Department of Safety and Security offers the following safety tips:
- Ensure your cell phone number is in the Banner Self-Serve system (Emergency Text Phone Number box) to receive text message NinerAlerts. NinerAlerts are sent via a variety of methods when there is a threat to campus safety or a change in operating condition.
- For every NinerAlert that is issued, an action directive is also included in the body of the message. Action Directives can include run, hide, fight; seek shelter; or evacuate. Visit emergency.uncc.edu for more information on what each directive means.
- Download the Livesafe app. This connects you to campus police via phone or text 24/7.
  - 911 dialed from a mobile phone connects to CMPD and can slow down response.
  - Alternatively, you can put the UNC Charlotte Police emergency number in your phone: 704-687-2200.
- Always be aware of your surroundings and know the quickest escape routes: exit doors, windows, etc.
- Safety and Security offers a variety of trainings to students. For more information, visit: https://police.uncc.edu/crime-prevention-safety
- Remember: Personal pepper spray is allowed on campus. However, guns and knives are not.

Action Directives included in NinerAlerts:

Run-Hide-Fight is the action directive for an active assailant.
- **RUN**: If outside or in a building and it is safe to flee, run and leave the campus if possible.
- **HIDE**: If you are in a building and unsure of where the threat is, find the closest room in which to hide. Close, lock and/or barricade doors if they do not lock. Do not huddle in one location. Remain quiet.
- **FIGHT**: This is a last-resort option. Do not seek the assailant. If you come into direct contact with the individual, use any means necessary to defend yourself.

A **Seek Shelter** directive is normally issued during severe weather or hazardous material releases. If a Seek Shelter is ordered:
- Stay inside if you are indoors.
- If outside, quickly go to the nearest building.
- Once indoors, find a space in the building to shelter. Stay away from windows.

- In a tornado, go to the lowest floor of the building and find an interior room or hallway to shelter in. Stay away from windows.

An **Evacuation** can be for either a single building, area, or the entire campus. Further information and direction will be included in the NinerAlert.

Syllabus Revisions/Changes to Course Plan

The contents of this syllabus are as complete and accurate as possible at this time. However, there may be adjustments, as needed when collaborating with a community partner/client on a 'real world' project, or as the result of pandemic-related issues, depending on progress we make toward our course goals and objectives. I will inform you (during our class time and on the Canvas course site) of any changes as they may occur throughout the semester. However, it is your responsibility, as the student, to keep track of announced changes that have been made in order to successfully complete the requirements of the course.