The preferred method of communication regarding course content and assignments is by Piazza. This is a tool that allows us to discuss questions openly and for your classmates to benefit from answers to previous questions. I will respond to all emails within 48 hours Monday-Friday. Please keep in mind that it will generally take longer to receive a reply via email.

Course Description

Develops skills in the management, analysis, and reporting of health data using SAS, including introductory applied statistical analysis. Students use SAS in exercises to control costs, improve quality, adjust for risk, quantify access, target marketing, measure population health, and evaluate policies and programs. Focuses on using base SAS and SAS STAT, and introduces SAS Maps, Enterprise Miner, and Visual Analytics to generate reports, develop clinical, financial, and operational recommendations for managerial action, and communicate with stakeholders. Also introduces SPSS, Stata, SQL, IML/R, qualitative methods, and managerial, legal, and ethical concepts in healthcare data analysis.

Pre or Co-requisite

For those in the Health Informatics & Analytics master’s program (as well as others required to take this course and/or who have completed a statistics course), please make sure you have reviewed the Biostatistics Self-Assessment that was sent to you by the program director, Dr. Yaorong Ge, upon acceptance into the program. This Biostatistics Self-Assessment is also available to you within the Start Here module in
Canvas. If after completing the assessment you are not comfortable with your level of statistics skills, please consider taking a statistics course prior to this class, as recommended by all programs requiring this course, or alternatively acknowledge that you may need to allocate more time to keep up with the course if you need statistics refreshing.

**Meeting Times**

Online, asynchronous with the exception of Online Oral Presentations via Zoom (Date TBD) for the Data Analytics Team Project (see Modules 16 and the Data Analytics Team Project Module for details)

**Course Objectives**

- CO1: Explain the role analytics serves in the disciplines of public health, medicine, and the broader healthcare sciences.

- CO2: Execute accurate and functional SAS code for correctly reading, managing, and analyzing public health, medical, or healthcare data.

- CO3: Develop critical thinking skills for solving challenging, real world public health, medical, or healthcare analytic problems.

- CO4: Interpret correctly statistical analyses of public health or healthcare questions.

- CO5: Apply methods of healthcare data analysis using SAS to a public health, medical, or healthcare dataset of your group’s choice within a team project.

- CO6: Communicate effectively public health or healthcare analytic results in a meaningful way for decision making.

This course contributes to and assesses the following Master of Public Health Population Health Analytics (MPH PHAN) Concentration Competencies:

- Write programming code (SAS, R, SPSS, Stata, Python, or similar analytic programming language) to analyze a dataset of any size

   This competency is assessed in the Data Analytics Team Project where students identify a dataset of interest, develop a hypothesis, select appropriate methods to test it, develop programming code to run their analysis in a statistical software package and, finally, present their findings in written in oral form.

Assessment of the above competencies is embedded within assignments and weekly problem-solving exercises involving a national population health dataset from the National Center for Health Statistics, as well as within a data analytics team project and presentation/report where students identify a public health question and generate an analysis from a population health dataset.
**Course Overview**

This course is fully online and requires access to a computer, internet (for Canvas, etc.), and SAS (see Course Materials below regarding access to SAS statistical software). All analyses should be performed using SAS unless stated otherwise. The course is organized by week/module with a total of 17 weekly modules, which includes the final exam week. Within each module, the module overview page lists the module objectives for that module, the materials needed for that module, corresponding activities and assessments, and alignment among activities, assessments, module objectives, and course objectives. The course is taught using a mixture of: PowerPoint slides containing concepts, SAS applications, and problem-solving exercises; discussion posts; quiz; assignments; exams; data analytics team project; and oral presentation.

**Course Materials**

**Required Biostatistics Self-Assessment** (available in Canvas & upon admission to Health Informatics & Analytics programs, the latter provided by Dr. Yaorong Ge, Program Director):  
**Biostatistics: A Refresher**, Kevin M. Sowinski, Purdue University, 2015, pgs. 1-445 – 1-466.

**Required Course PowerPoint Slides** (available in Canvas)

**Required Software** (not necessary to purchase, as it is available for UNC Charlotte students & faculty via the university software center at [https://software.uncc.edu](https://software.uncc.edu)):

**SAS Statistical Software**

*Any additional required readings will be communicated on the course Canvas site.*

+++++++  

**Recommended Text:**  

**Supplemental Recommended Text:**  

Additional Supplemental Resources: Depending on your background, you may wish to review additional supplemental resources. The faculty have identified the following resources as broadly useful to all students:


Statistics review website: http://onlinestatbook.com

Permission to use Course Materials:
All course PowerPoint slides, assignments, quiz(zes), and the Data Analytics Team Project Outline/Rubric were created by Dr. Laura Gunn, Associate Professor of Public Health Sciences & Director of Health Analytics, University of North Carolina at Charlotte. Permission to use, modify, and/or distribute any of these materials must be approved in writing by Dr. Gunn. If approved, please reference the work in the following format: Gunn, L. (2019). HCIP 6102: Healthcare Data Analysis, Module XXX [Course Presentation]. Retrieved from XXX.

Permission to use the Biostatistics Self-Assessment was provided by Dr. Michael Thompson, Health Informatics & Analytics Program Director & Associate Chair of Public Health Sciences, who obtained it from Purdue University.

Grading Criteria

<table>
<thead>
<tr>
<th>Assessments</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments (5 at 100 points each)</td>
<td>25%</td>
</tr>
<tr>
<td>Scavenger Hunt for Bugs</td>
<td>1%</td>
</tr>
<tr>
<td>Module 1 Quiz</td>
<td>1%</td>
</tr>
<tr>
<td>Discussion Posts (11 total)</td>
<td>11%</td>
</tr>
<tr>
<td>Data Analytics Team Project (95 points) + Self/Peer Evaluation (5 points)</td>
<td>30%</td>
</tr>
</tbody>
</table>
**Project Overview**: Students identify a dataset of interest, develop a hypothesis, select appropriate methods to test it, develop programming code to run their analysis in a statistical software package and, finally, present their findings in written or oral form.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Analytics Team Project Presentation</td>
<td>7%</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>

Guidelines for each assessment are provided within the course Canvas site. In general, I will post grades for all graded assessments within approximately 2 weeks.

**Grading Scale**

- A 90.0% to 100%
- B 80.0% to <90.0%
- C 70.0% to <80.0%
- D 60.0% to <70.0%
- F <60.0%

**Course Policies**

**Late Activities Policy**

Any late activity (i.e., assignments, discussion posts, quiz, exams, team project & presentation) will incur a 10% reduction in points (from the original total points available) for each day it is late, up until the time I post grades or solutions (whichever comes first). Plan your time accordingly. I will not accept late activities after I post solutions or grades unless there is a documented and excused (via the Dean of Students Office) extenuating circumstance (e.g., illness with a doctor’s note).

**Working Individually & Collaboratively within this Course**

Assignments and exams should be completed individually. You may, however, work with your peers on problem-solving exercises, if you choose to do so. If you choose to work together on problem-solving exercises, then please identify, at the top of your discussion post of your solutions, with whom you worked; though, each individual will submit his/her own solutions in the discussion post. The data analytics team project requires collaboration among 2-3 students per team. The team project will involve analysis, by applying appropriate descriptive and inferential statistical methods as well as data visualization techniques, of a health dataset of your team’s choice, using SAS programming, to draw evidence-based conclusions. Information and instructions regarding course activities, including the team project, are provided in Canvas.
NOTE: Students should check the Canvas course site and their UNC Charlotte email at least once per day during the semester to be aware of any course announcements.

Recommended Flash Drive

In conversations with campus IT, students no longer have access to an H drive and IT won’t allow us to save files on the individual computer workstations in the labs (since files are deleted every week). Additionally, IT indicated that they would have to remove the application that maps files from a Google drive to SAS each week in the lab. Therefore, each student will need to bring her/his own flash drive with them if using on-campus computers (in labs), in which case an 8 GB (or greater) flash drive to save files and work should be sufficient.

Prohibition of Recordings (taken directly from the Office of Legal Affairs)

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.

Course Schedule

Below is a course schedule of the week/module, dates, and topics covered throughout the course. Within each Module Overview page, you will find module objectives associated with each module. There is also a map that links each activity with the corresponding module and course objectives assessed.

<table>
<thead>
<tr>
<th>Week/Module</th>
<th>Dates</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start Here!</td>
<td>Wednesday, January 20</td>
<td>Course Overview</td>
</tr>
<tr>
<td>Week/Module 1</td>
<td>Wednesday, January 20 – Sunday, January 24</td>
<td>Introduction to Healthcare Data Analysis, Including (Big) Data Storage, Security, &amp; Dynamic Collection &amp; Capture</td>
</tr>
<tr>
<td>Week/Module 2</td>
<td>Monday, January 25 – Sunday, January 31</td>
<td>Introduction to SAS Programming</td>
</tr>
<tr>
<td>Week/Module 3</td>
<td>Monday, February 1 – Sunday, February 7</td>
<td>Descriptive Analyses of Healthcare (Big) Data in SAS</td>
</tr>
</tbody>
</table>

Spring Recess: February 8 – February 13
| Week/Module 4 | Monday, February 15 – Sunday, February 21 | Visualization of Healthcare Data in SAS |
| Week/Module 5 | Monday, February 22 – Sunday, February 28 | Variable Creation, Transformation, & Handling Missing Data within Healthcare Applications in SAS |
| Week/Module 6 | Monday, March 1 – Sunday, March 7 | Hypothesis Testing Review & T-tests Using Healthcare Data in SAS |
| Week/Module 7 | Monday, March 8 – Sunday, March 21 | Midterm Exam & Preview Data Analytics Team Project Module |
| Weeks/Modules 7-16 | Monday, March 8 – Sunday, March 14 | Data Analytics Team Project |
| Week/Module 8 | Monday, March 15 – Sunday, March 21 | More Hypothesis Testing within Healthcare Applications in SAS |
| Week/Module 9 | Monday, March 22 – Sunday, March 28 | Linear Correlation & Simple Linear Regression Using Healthcare Data in SAS |
| Week/Module 10 | Monday, April 5 – Sunday, April 11 | Multiple Linear Regression Analysis within Healthcare Applications in SAS |
| Week/Module 11 | Monday, April 12 – Sunday, April 18 | Multiple Logistic Regression, Odds Ratios, & Relative Risks within Healthcare Applications in SAS & Peer-reviewed Literature |
| Week/Module 12-14 | Monday April 12-May 2 | Group Work on Data Analytics Team Project |
| Week/Modules 15 | Monday, May 3 – 5 | Data Analytics Team Project Presentations files due; Analytics Project Report Due |
Relevant Univerity & Course Policies

COVID-19 Policies

Face Coverings Are Required

It is the policy of UNC Charlotte for the Spring 2021 semester 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 while in buildings including in classrooms and labs. Students are permitted to remove face coverings in classroom or lab settings only when I explicitly grant permission to do so (such as while asking a question, participating in class discussion, or giving a presentation) and while at an appropriate physical distance from others. 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.

Official Course Attendance Policy

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:

- **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, complete this form to alert the University. Representatives from Emergency Management and/or the Student Health Center will follow up with you as necessary, and your instructors will be notified.
- **If you have been exposed** to COVID-19 positive individuals and/or have been notified to self-quarantine due to exposure, complete this form to alert the University. Representatives from Emergency Management and/or the Student Health Center will follow up with you as necessary, and your instructors will be notified.
To return to class after being absent due to a COVID-19 diagnosis or due to a period of self-quarantine, 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 do the following to help you continue to make progress in the course by providing materials accessible online and alternatives for remote group work. The final decision for approval of all absences and missed work is determined by the instructor.

**General Course Policies**

**Course Credit Workload**

This is a 3-credit graduate course which requires 3 hours of ‘classroom’ instruction and at least 6 hours of ‘out-of-class’ student work each week for approximately 15 weeks. Since this is an online course without meeting in the classroom, students are expected to spend approximately 9 hours/week on this course across activities such as: readings, analyses, (library) research, assignments, discussion posts, preparing for exams, 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](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](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/2017-08-15_UP-407-TheCodeOfStudentAcademicIntegrity-APPROVED.pdf](https://legal.uncc.edu/sites/legal.uncc.edu/files/media/2017-08-15_UP-407-TheCodeOfStudentAcademicIntegrity-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.

Special Accommodations/Disability Support Services (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 (Fretwell 230).

Students in this course seeking accommodations to disabilities must first consult with the Office of Disability Services and follow the instructions of that office for obtaining accommodations. The Office of Disability Services works with current undergraduate and graduate students along with prospective students to ensure equal access to UNC Charlotte’s campus and educational programs.

All services are dependent upon verification of eligibility. Once approved for services, students receive accommodations which are based upon the nature of an individual’s disability and documented needs. Students are strongly encouraged to register or check-in for their accommodations with a Disability Services counselor as soon as they have registered for classes. Accommodations are not retro-active and will not begin until the student notifies his or her faculty by providing the Letter of Accommodation. Please visit the Office of Disability Services at for additional resources, email questions to disability@uncc.edu, or call 704-687-0040 (tty/v) for more information.

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).

Diversity, Title IX, & Responsible Use of University Computing (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.

You may read more at the following link, which also includes information for reporting misconduct (including Title IX):


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 (http://legal.uncc.edu/policies/up-307). 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.

**Additional Student Support & Available University Resources**

**University Writing Resources Center**

For those of you who may need or wish to seek assistance with improving your writing for assignments/reports, I encourage you to visit the University Writing Resources Center (WRC) for free tutoring and assistance. 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, call, or email: https://writing.uncc.edu/writing-resources-center | 704-687-1899 | wrchelp@uncc.edu

**Atkins Library Research Help Desk**

The Atkins library also has resources available to guide you when conducting any research you may need throughout this course. To learn more, visit their website: https://library.uncc.edu/atkins/researchconsultation.

**Counseling Center**

Graduate school, and life experiences outside of graduate studies, can be stressful at times. 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 (704-687-2200).

Additional Student Support Services

- University Center for Academic Excellence (UCAE) | (704) 687 7837 | uncc-ucae@uncc.edu
- Veteran Student Services | 704-687-5488 | veteranservice@uncc.edu
- Multicultural Resource Center | 704-687-7121 | mrc@uncc.edu
- List of computer labs on campus
- Atkins Library Laptop Lending program

Withdrawals

Students are expected to complete all courses for which they are registered at the close of the add/drop period. If you are concerned about your ability to succeed in this course, it is important to make an appointment to speak with me as soon as possible. The University policy on withdrawal allows students only a limited number of opportunities available to withdraw from courses. It is important for you to understand the financial and academic consequences that may result from course withdrawal.

Incompletes

The grade of I is assigned at the discretion of the instructor when a student who is otherwise passing has not, due to circumstances beyond his/her control, completed all the work in the course. The missing work must be completed by the deadline specified by the instructor, and no later than 12 months. If the I is not removed during the specified time, a grade of F, U, or N, as appropriate is automatically assigned. The grade of I cannot be removed by enrolling again in the same course, and students should not re-enroll in a course in which they have been assigned the grade of I. University policy addressing Incompletes.

Syllabus Revisions
The contents of this syllabus are as complete and accurate as possible at this time, and there may be adjustments depending on progress we make toward our course goals and objectives. I will inform you 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.