Instructor: Dr. Franck Diaz-Garelli  
Assistant Professor of Health Informatics and Analytics  
Email: franck.diaz@uncc.edu  
Office: CHHS 356  
Phone: 704-687-5610  
Office Hours: Mondays 3-5pm (Virtually preferred)  
Online through Virtual Office Discussions (see Canvas course site);  
In-Person & Online via WebEx (by appointment)  

Communication Channels (First ones preferred):  
1. During, Before & After class (Instant success)  
2. Piazza on Canvas (You may find your search or in a few minutes)  
3. CANVAS forums (Response within 12 hours, usually).  
4. Office Hours (Perhaps instant, perhaps in two days, perhaps next week).  
5. Email isn’t a good idea; your email is one in 300 that day.  

My preferred method of contact 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  

Business Intelligence is a collection of computer-based techniques used to extract, identify and analyze data. Analytics is key in the transformation of the healthcare industry. Healthcare business intelligence can provide organizations with the ability to improve quality of care, increase financial efficiency and operational effectiveness, conduct innovative research and satisfy regulatory requirements. Business Intelligence provides better access to information. It provides current and predictive views across the enterprise. Common functions of BI are reporting, data mining, analytical processing, knowledge management, and data visualization. Topics include: elements of business intelligence, business analytics, data visualization, data mining, data warehousing, and business performance management.
A class schedule document describes the topics to be covered each week during the semester. Given the potential for changes to this schedule, this document will be a living, fluid document. The current version will be maintained on the class Canvas site.

### Pre or Co-requisite

HCIP 6102 and HCIP 6380.

### Meeting Times

Official Meeting Times: Wednesdays, 5:30p-8:15p

COVID19 Options:
- Hybrid with a combination of in-person and virtual meetings
- Online with synchronous meetings at scheduled times every other week.
- Online, asynchronous with the exception of Online Oral Presentations via WebEx (Date TBD) for Final Project Presentations

The instructor will adapt to COVID19 circumstances and student group preferences.

### Course Objectives

- This course will offer an overview of methods and solutions for understanding business intelligence and needs in healthcare.
- This course will identify different options for delivering business intelligence across healthcare enterprise.
- This course will also draw parallels, similarities, and differences between the existing tools and solutions.
- After taking this course, students will be able to explain delivery of information and business intelligence to different roles across organization.
- After taking this course, students will also be able to use one of the existing commercial tools to address problems often found in real life.

### Course Materials

**Required Text** – This book’s goal is to provide additional training exercises to build tableau skills. If you are comfortable with data analytics, programming, data visualization and data science, you may be able to do without it. Please have a quick chat with the instructor before you decide to forego this.


**Useful Texts** - These books are available free of charge through the library.
1. Healthcare Business Intelligence: A Guide to Empowering Successful Data Reporting and Analytics  

2. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses  

Cool Reading to Go Beyond - Additional reading if you want to learn more.

Required Course PowerPoint Slides (available in Canvas)

Required Software: Tableau Desktop (Required), Tableau Prep. (Useful but optional). Purchase is not required. Educational Licenses will be provided on the Canvas site to support installation into your IT system.

Nifty Tool: If you don’t want to run Tableau on your computer you can use it via UNCC’s virtual desktop service called Apporto (https://uncc.apporto.com/).

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

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. Diaz Garelli. If approved, please reference the work in the following format: Diaz Garelli, F. (2020). HCIP 6396: 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>
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Class Participation 20%
BI Tool Presentations 20%
Midterm Exam 25%
BI Team Project (95 points) 35%

**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 in oral form.

Total 100%

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).

**Syllabus Subject to Change**

The standards and requirements set forth in this syllabus may be modified at any time by the course instructor. Notice of such changes will be by announcement in class, written or email notice, or by changes to this syllabus posted on the course website at (URL).

**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</th>
<th>Date</th>
<th>Main Topic</th>
<th>Deliverables</th>
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<tbody>
<tr>
<td>1</td>
<td>9-Sep</td>
<td>Introduction to Business Intelligence, Review Syllabus &amp; Class Schedule</td>
<td></td>
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<tr>
<td>2</td>
<td>16-Sep</td>
<td>Aligning Business &amp; IT/Data Strategy</td>
<td>BI Tool Slides + Summary Slide</td>
</tr>
<tr>
<td>3</td>
<td>23-Sep</td>
<td>Data Governance, Profiling and Quality</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>30-Sep</td>
<td>Introduction to Tableau</td>
<td></td>
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<tr>
<td>5</td>
<td>7-Oct</td>
<td>Data Presentation &amp; Reporting</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>14-Oct</td>
<td>Midterm Exam</td>
<td>Midterm Exam &amp; Dashboard Files</td>
</tr>
<tr>
<td>7</td>
<td>21-Oct</td>
<td>Dashboards as Decision Support Systems &amp; Good Visual Design Principles</td>
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<tr>
<td>8</td>
<td>28-Oct</td>
<td>Business Process and Performance Management</td>
<td></td>
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<tr>
<td>9</td>
<td>4-Nov</td>
<td>Principles of Data Visualization Review</td>
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<tr>
<td>10</td>
<td>11-Nov</td>
<td>Final Project In-Depth Research and Discussion Session</td>
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<tr>
<td>11</td>
<td>18-Nov</td>
<td>Analytics Tool Usefulness Discussion</td>
<td>Updated BI Tool Summary Slide</td>
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<tr>
<td>12</td>
<td>25-Nov</td>
<td>THANKSGIVING</td>
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<tr>
<td>13</td>
<td>2-Dec</td>
<td>Final Project Support Session</td>
<td></td>
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<tr>
<td>14</td>
<td>9-Dec</td>
<td>Final Presentations</td>
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<tr>
<td>15</td>
<td>16-Dec</td>
<td>Feedback Day (Optional)</td>
<td>Final Reports &amp; Presentations</td>
</tr>
<tr>
<td>16</td>
<td>23-Dec</td>
<td>Last Day of Classes</td>
<td></td>
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</tbody>
</table>

Detailed Course Content (Subject to Change)

1. Introduction to BI
   
   Intro Lecture – Setting the context
   - What is BI/ What BI isn’t
   - Do you need BI?
   - Healthcare Information Environment
   - Gartner BI maturity model

   Course Info & Syllabus Discussion
   - Course Topics
- Grading
- Deliverables
- Final Project
- How to tell a story
- BI Tool Presentation Requirements

2. Aligning Business and IT strategy
   **Aligning Business and IT**
   - The Tenets of Healthcare BI
   - Healthcare data
   - Data Integration (ETL process)
   - Data Warehousing

   **BI Tools Presentations & Discussion**
   - Present a BI tool of your choice along with its benefits and limitations
   - Speculate on each BI tool’s usefulness
   - Turn in slides presented + 1 Summary slide to be discussed at the end of the class

3. Data Quality/ Governance/ Profiling + Excel
   **All about the data**
   - Data Quality
   - Data Governance
   - Data Profiling

   **Excel Lecture (Subject to Change)**
   - Excel Data Importing
     a. Importing a database table
     b. Querying the excel database
   - Using excel to clean data (basic manipulative functions)
     a. Talk about a sample function - concatenate
     b. V-lookups
   - Pivot tables and charts
     o What are pivot tables? How to create one?
     o Custom calculations in pivot tables
     o Creating pivot charts
     o Grouping/ filtering on pivot charts
   - Excel Statistical Analysis

4. Introduction to Tableau
   **Tableau Lecture 1 – Introduction**
   - What is Tableau?
   - Exploring the program interface
   - Data types and Dimensions vs Measures
- Importing data (Simple)
- Creating a simple viz (bar, histogram, line, pie, etc)

**Tableau Lecture 2 – Managing Data Source/ Fields and Intermediate Charts**
- Multiple Data Sources
- Data joining and blending
- Intermediate charts
- Calculated fields
- Tableau for Healthcare Chapters 5,9,13,17 & 20

5. Data Presentation and Reporting Tableau

**Tableau Lecture 3 – Dashboards, Parameters, and Filters**
- Dashboards Basic
- Dashboards action - advanced
- Parameters

**Data Presentation Lecture: Storytelling WITH data**
- Storytelling WITH data
- Scientific Example

**Tableau Lecture 4 – Building a Dashboard and a Story in Tableau**
- Students will build a dashboard from a given business problem
- Data will be provided and discussed in class
- Tableau for Healthcare Chapters 24 & 25

6. Midterm Exam

**In-Class activity**
- Students will have to create a dashboard using provided data
- Business Questions will be answered with charts and dashboards

7. Dashboards as Decision Support Systems & Good Visual Design Principles

**In-Class activity**
Students
[https://www.tableau.com/blog/stephen-few-data-visualization](https://www.tableau.com/blog/stephen-few-data-visualization)

8. Data Visualization & Dashboard Design

**Tableau Lecture 4 – Story telling and Forecasting**


Tableau for Healthcare Chapter 23
10. Final Project In-Depth Research & Discussion Session
   Student-driven session.

11. Analytics Tool Usefulness Discussion
   Review your all BI tool presentations and discuss whether you still agree
   with the pros & cons
   Open session for final project feedback

12. THANKSGIVING – NO CLASS

13. Final Exam Presentation

### Relevant University & Course Policies

#### COVID-19 Policies

**Face Coverings Are Required**

It is the policy of UNC Charlotte for the Fall 2020 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](https://www.cdc.gov) 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](https://www.unc.edu).

#### 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.
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/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): https://legal.uncc.edu/sites/legal.uncc.edu/files/media/NoticeNondiscrimination.pdf.

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)](uncc-url:https://ucase.uncc.edu) | (704) 687 7837 | uncc- ucae@uncc.edu
- [Veteran Student Services](uncc-url:https://veteranservice.uncc.edu) | 704-687-5488 | veteranservice@uncc.edu
- [Multicultural Resource Center](uncc-url:https://mrc.uncc.edu) | 704-687-7121 | mrc@uncc.edu
- [List of computer labs on campus](uncc-url:https://laptop.lending.library.uncc.edu)
- [Atkins Library Laptop Lending program](uncc-url:https://library.uncc.edu/atkins)

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.