**Crime Analytics (CJUS 6106)**

**Spring Semester, 2023**

**Fretwell 116, Tuesdays 5:30pm to 8:15pm**

**INSTRUCTOR INFORMATION:**

**Name:** Samuel E DeWitt (you may call me Professor DeWitt or Dr. DeWitt)

**Email:** [samuel.dewitt@uncc.edu](mailto:samuel.dewitt@uncc.edu)

**Office:** Colvard Hall, Room 5084

**Office Hours:** By appointment

**REQUIRED TEXT:**

Imai, Kosuke. (2017). *Quantitative social science: An introduction*. Princeton University Press.

**SUPPLEMENTAL TEXTS**

Cunningham, Scott. (2021). *Causal inference: The mixtape*. Yale University Press. (Available for free online: <https://mixtape.scunning.com/>).

EMC Education Services. (2015). *Data science & big data analytics.* Wiley. (Available on Perusall for free).

Huntington-Klein, Nick. (2022). *The effect: An introduction to research design and causality.* CRC Press. (Available for free online: <https://theeffectbook.net/index.html>).

James, Gareth, Daniela Witten, Trevor Hastie, & Robert Tibshirani. (2013). *An introduction to statistical learning with applications in R.* Springer. (Available on Perusall for free).

Timbers, Tiffany, Trevor Campbell, & Melissa Lee. (2022). *Data science: A first introduction.* CRC Press. (Available on Perusall for free).

Wickham, Hadley. (2016). *ggplot2: Elegant graphics for data analysis*. Springer. (Available for free online: <https://ggplot2-book.org/index.html>).

**COURSE OBJECTIVE:**

This course is required to fulfill the support sequence for the M.A. program in criminal justice. Crime analytics is the scientific process of discovering and disseminating patterns of criminological data. The field of crime analytics relies on the simultaneous application of statistics, computer programming, and advanced analytical methods to improve decision-making. This course will provide an overview of the concepts and skills necessary to solve the challenges of analyzing complex data sets, often when such data is in a constant state of change and when decisions are needed in real time.

**LEARNING GOALS:**

Students will:

1) understand the basics of multivariate OLS and its variants;

2) learn how to locate, download, and clean data;

3) learn how to explore/analyze data using visualizations;

4) understand how to apply these skills to your own independent analysis;

5) develop thorough understandings of various advanced data analytic techniques.

**COURSE REQUIREMENTS:**

There will be several components to your grade including calculation/programming assignments and exams. The breakdown is as follows:

|  |  |
| --- | --- |
| **Grade Components** | **Worth** |
| Perusall Discussions | 10% |
| Programming Exercises | 40% |
| Research Paper | 40% |
| Research Presentation | 15% |

|  |
| --- |
| A: 89.45-100% |
| B: 79.45-89.44% |
| C: 69.45-79.44% |
| D: 59.45-69.44% |
| F: <=59.44% |

Completion of the Criminal Justice graduate program requires that you obtain a grade of “B” or better in this course. Extra credit will not be given, and the professor will not allocate a grade of “B” that is unearned simply because a student needs to graduate.

PERUSALL DISCUSSSIONS: Each week the required supplemental readings will be posted on a online learning tool called Perusall. Perusall is a means for students to comment and ask questions about content within the required readings as a group rather than doing so individually. Perusall automatically provides grades for your engagement with course content, taking into account how much of the document you actively read, the quantity and quality of your comments/questions, and the quantity/quality of your responses to the comments/questions from other students. There will be 10-12 graded topics on Perusall and I will drop the lowest two grades.

PROGRAMMING EXERCISES: There will be 8-10 take-home programming exercises, due by 11:59pm on the day indicated on Canvas. I will post all exercises the week they are due. Exercises will cover new material from lectures and assigned readings. Exercises will consist of several multi-part questions which will require data cleaning, manipulation, and analysis in R and sometimes step-by-step calculations using the equation language in RMarkdown (LaTex). I will drop the lowest two exercise grades.

RESEARCH PAPER: Each student will independently complete a research paper on a topic of their choosing but pertaining to the study of criminology or criminal justice. To complete this research paper, students will select from a list of pre-approved data sets which I will make available on Canvas (the list of data sets, not the data sets themselves). All students must have their topic and data set approved by the professor no later than February 1st. The research paper will be submitted in multiple parts throughout the semester – see Canvas for additional details.

If a student has trouble selecting a topic, the student is encouraged to speak to the professor and ask for guidance.

The research paper is intended to be an in-depth description of the identification of a research question, the selection and acquisition of a data set, the data management procedures, all variable transformations or other data cleaning steps taken, the analytic strategy, results, and conclusions. The paper should begin with a brief introduction and literature review of roughly 2-4 pages. The total paper should be between 15-20 pages, including all tables, graphs, charts or other graphs, but not including references. Thus, the bulk of the paper should be devoted to the analytic procedures involved.

A minimum of 20 unique sources are required, which should be drawn from the academic literature (i.e. peer-reviewed journals and books). These 20 sources must be in addition any of the readings assigned for this course, although you are welcome to use those. If you are unsure of whether a source qualifies as coming from the academic literature, you are welcome to ask me. All sources must be properly cited using a standard format (e.g. APA, ASA, MLA). In-text citations should be used. All sources in the reference list should appear in the in-text citations, and all in-text citations should appear in the reference list.

Each student is required to submit at least one early draft of the paper for review by the professor. It is not expected that the draft submitted for review will be complete. The first draft should cover the research question, an initial literature review, and the beginnings of the data management section, and the beginnings of the research methods or analytic strategy section. The firm deadlines for review will be provided on Canvas. Students who do not submit the required draft by the deadline are subject to penalization on the final paper, and may not have their work reviewed.

In addition to the paper, the student will submit an R Markdown document that shows all data cleaning, data management and transformation steps, as well as all analyses and all graphics, including the code that was used to perform all of the above. This Markdown document should be a professionally formatted document that is intended as a supplement to the main paper.

**COURSE POLICIES:**

1) ATTENDANCE: Attendance is a really good idea. This is an in-person class and I will not post lecture narrations to Canvas or Perusall. Lecture content will be made available on Canvas/Perusall after each class. Failure to routinely attend class will negatively affect your grade because it will be difficult to understand the material and complete programming exercises if you do not come to class. I will not take attendance in class nor will I provide points for attending class. You are all adults and are capable of making your own decisions

2) LATE ASSIGNMENT POLICY: Students will be allotted four “Life Happens” passes for the semester. A “Life Happens” pass may be used to extend the due date for a homework assignment, exam, or exam revision by 72 hours (including weekend days – e.g., an assignment due by Friday at 11:59pm would then be due the following Monday by 11:59pm). You need not provide a reason for the request and I will not ask for one. If you would like to use one of these “Life Happens” passes you only need to email me BEFORE the assignment is due and let me know that you will be using one of your passes. You may NOT use a “Life Happens” pass on the final part of the research paper – as I generally have it due with just enough time to grade it and input final grades.

You may only use one pass per assignment – you cannot extend the due date any further past the initial 72-hour extension (unless, of course, there is a medical or other university-excused reason for the need for a longer extension – please contact me in those scenarios and we will work out a reasonable due date for you).

3) APPOINTMENTS AND EMAIL ETIQUETTE: If you have a question or a problem, see me before lecture or contact me through email. When emailing me to schedule an appointment be sure to send me three times you are available to meet, and we will find a time that works for both of us. Office meetings will be held via Zoom, not in my personal office.

When you send me an email, put the course name in the subject, be courteous, and sign your name If you send me an email (for any reason), after I reply, send me a reply to confirm you received it, even if it just says “okay” or “thanks.”

I will answer any emails I receive around the end of each workday, typically from 3pm to 4pm during the week (Monday through Friday). I will make my best effort to answer all emails within a 24-hour period, so long as they are received before 4pm on Fridays (in which case, a response will be sent the following Monday). All inquiries about grades sent through email will not be answered via email; you must schedule an appointment to discuss grades. Please note that inquiries about grades may result in an increase to your grade (if your argument is reasonable and I feel you deserve more points than you were awarded) or a decrease to your grade (if your argument is unreasonable and I feel you deserve fewer points than you were awarded).

4) ACADEMIC INTEGRITY: Students are required to have knowledge of and observe all regulations pertaining to campus life and student deportment. The University has enacted two codes of student responsibility: The UNC Charlotte Code of Student Academic Integrity and The UNC Charlotte Code of Student Responsibility. This Code forbids cheating, fabrication or falsification of information, multiple submission of academic work, plagiarism, abuse of academic materials (such as Library books on reserve), and complicity in academic dishonesty (helping others to violate the Code). Any further specific requirements or permission regarding academic integrity in this course will be stated by the instructor, and are also binding on the students in this course. For more information, please visit <http://integrity.uncc.edu/>.

Students who violate the Code can be punished to the extent of being permanently expelled from UNC Charlotte and having this fact recorded on their official transcripts. The normal penalty is zero credit on the work involving dishonesty and further substantial reduction of the course grade. In almost all cases, the course grade is reduced to "F." If you do not have a copy of the Code, you can obtain one from the Dean of Students Office or access it online at http://www.legal.uncc.edu/policies/ps-105.html. Standards of academic integrity will be enforced in this course. Students are expected to report cases of academic dishonesty they become aware of to the course instructor who is responsible for dealing with them. As students willingly accept the benefits of membership in the UNC Charlotte academic community, they acquire obligations to observe and uphold the principles and standards that define the terms of UNC Charlotte community cooperation that make those benefits possible.

\* Bottom line: Do not cheat. I have failed students for integrity violations before, and I am

sure that I will do so again.

\*\* It is your responsibility as a student to know and understand what constitutes cheating, plagiarism, and other violations of academic integrity. My assumption is that you already know what cheating and plagiarism are, and that you will conduct yourselves accordingly. Any violation is subject to penalization.

\*\*\* Special note on plagiarism: If you are unsure of how to properly cite references or sources, you are welcome to ask me before the assignment is due. If you submit work with plagiarized material, and did not consult with me prior, you will be heavily penalized. Saying that you forgot to cite something, or that you cited it incorrectly, or other similar excuses, will not be tolerated, and will not exempt you from penalization. You will not receive any other warnings.

5) SEXUAL HARASSMENT: All students are required to abide by the UNC Charlotte Sexual Harassment Policy (http://www.legal.uncc.edu/policies/ps-61.html) and the policy on Responsible Use of University Computing and Electronic Communication Resources (http://www.legal.uncc.edu/policies/ps-66.html). Sexual harassment, as defined in the UNC Charlotte Sexual Harassment Policy, is prohibited, even when carried out through computers or other electronic communications systems, including course-based chat rooms or message boards. 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.

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](http://titleix.uncc.edu/about-title-ix/definitions) 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](https://cm.maxient.com/reportingform.php?UNCCharlotte).  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](http://counselingcenter.uncc.edu/), 7-0311); (2) Student Health Center ([studenthealth.uncc.edu](http://studenthealth.uncc.edu/), 7-7400); or (3) Center for Wellness Promotion ([wellness.uncc.edu](http://wellness.uncc.edu/), 7-7407).  Additional information about your options is also available at [titleix.uncc.edu](http://titleix.uncc.edu/) under the “Students” tab.

6) RELIGIOUS HOLIDAY OBSERVANCES: The University of North Carolina at Charlotte is committed to diversity, nondiscrimination and inclusiveness, and to supporting its students, regardless of religious affiliation or non-affiliation, in accordance with state and federal laws and regulations. UNC Charlotte provides reasonable accommodations, including a minimum of two excused absences each academic year, for religious observances required by a student’s religious practice or belief. Such reasonable accommodations must be requested in accordance with the procedures in the Policy, and include the opportunity for the student to make up any tests or other work missed due to an excused absence for a religious observance. 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 Religious Accommodation Form to their instructor prior to the census date for enrollment for a given semester. The census date for each semester (typically the tenth day of instruction) can be found in UNC Charlotte’s academic calendar.

A student who submits a Request for Religious Accommodation Form after the census date must show good cause for the late submission, and the late submission itself may be taken into account in determining whether the student has a religious practice or belief requiring accommodation and whether granting the request would create undue hardship. If there is no consensus on a reasonable accommodation, either party or both should seek the advice of the department chair. In those cases where a request for a religious accommodation is denied by the instructor, and there is no resolution through discussion with the department chair, the student may pursue a grievance under UNC Charlotte’s Student Grievance Procedure. Where a timely request is made by the student but denied by the instructor, the grievance process shall be expedited as much as reasonably possible to ensure that a student pursuing a religious accommodation is not unduly disadvantaged by the passage of time. Failure to comply with this Policy is a violation of University Policy and subject to disciplinary action in accordance with Policy Statement #25, Violation of University Policy.

7) CLASSROOM ETIQUETTE: *Cell Phones*: Cell phones should be on silent during class, and, more importantly, I do not want to see them (i.e., keep them in your pockets, not on your desk).

If this rule is violated, I will first ask the offending student to put their cell phone away or to make it silent (if it rings during class). If the rule is violated a second time, the student’s grade will be reduced by a whole letter grade (an A will become a B).

*Laptops:* Laptops are permitted but only for academic-related purposes. If a student is found to be checking Facebook during class, or simply surfing the internet, I reserve the right to revoke this privilege for that student.

**WANT THE CLIFF’S NOTES? IN ORDER TO SUCCEED…**

* Come to class as often as humanly possible, on time, ready to listen and contribute.
* Read the material and prepare some insightful comments or questions.
* Respect me, your fellow classmates, and yourself.
* Do not get behind, and do not wait until the last minute to study for exams or to complete assignments.
* Do not be afraid to ask for help if there is something you truly do not understand.

**FINAL NOTE**

This syllabus is meant to be interpreted as a living document. If at any time during the semester I feel the need to change sections of the syllabus to adapt to changing conditions of the classroom, or in the interest of time, I will write a revised version of this syllabus and upload it to Canvas.

**SCHEDULE**

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| --- | --- | --- | --- |
| **Session** | **Date** | **Subject** | **Readings** |
| 1 | 01/10/23 | Introduction to Course |  |
| 2 | 01/17/23 | Introduction to R and RStudio; Introduction to Data Analytics/Data Science | *QSS – Chapter 1*  *TE – Chapters 1-3* |
| 3 | 01/24/23 | Data Analytics Life Cycle, Reporting Data Analysis, Introduction to RMarkdown and LaTeX | *DSBDA – Chapter 2, 12*  *LaTeX for Beginners* |
| 4 | 01/31/23 | Accessing Data: Data Sources, Types, and Structures | *DSBDA – Chapter 3*  *Other Readings TBA* |
| 5 | 02/07/23 | Interacting, Querying. and Reporting Data | *DSBDA – Chapter 3*  *Other Readings TBA* |
| 6 | 02/14/23 | Data Cleaning and Management | *DSFI – Chapters 2-3* |
| 7 | 02/21/23 | Data Visualization Part I: Exploratory Graphics | *QSS – Chapter 3.1-3.5*  *GGPLOT – Chapters1-5* |
|  | 02/28/23 | **Spring Recess – No Class** |  |
| 8 | 03/07/23 | Data Visualization Part II: Analytic Graphics | *QSS – Chapter 3.6; 5.2 – 5.3*  *GGPLOT – Chapters 6-9* |
| 9 | 03/14/23 | Clustering and Association | *DSBDA – Chapter 4*  *ISL – Chapter 10*  *QSS – Chapter 3.6 - 3.7* |
| 10 | 03/21/23 | Regression Analysis | *CITM – Chapter 1*  *QSS – Chapter 2, 4*  *TE – Chapter 13* |
| 12 | 03/28/23 | Panel Data Structure and Methods | *CITM – Chapter 8*  *TE – Chapters 16-17* |
| 13 | 04/04/23 | Communicating Your Results | *Readings TBA* |
| 14 | 04/11/23 | Classification and Machine Learning | *ISL – Chapter 4, 8* |
| 15 | 04/18/23 | Text Analytics | *DSBDA – Chapter 9*  *QSS – Chapter 5.1* |
| 16 | 04/25/23 | Topic TBA | *Readings TBA* |
|  | 05/02/23 | Research Paper Presentations |  |

The professor reserves the right to alter this schedule as needed. Notification of such changes will be made as early as possible.

Key:

CITM: Causal Inference: The Mixtape (Cunningham)

DSBDA: Data Science & Big Data Analytics (EMC Education Services)

DSFI: Data Science – A First Introduction (Timbers et al.)

GGPLOT: ggplot2: Elegant Graphics for Data Analysis (Wickham)

ISL: Introduction to Statistical Learning (James et al.)

QSS = Quantitative Social Science (Imai)

TE = The Effect (Huntington-Klein)