



**DSBA 6010: Special Topics in DSBA - Applications of Large Language Models (LLMs)  
Course Syllabus Fall 2024**

**Basic Information**

**Instructor:** Ryan Wesslen, Ph.D.

**Office:** Virtual by appointment

**Email:** [rwesslen@charlotte.edu](mailto:rwesslen@charlotte.edu)

**Classroom:** The Dubois Center (Uptown) 504

**Class Hours:** Thursdays 5:30 pm – 8:15 pm (August 22 to December 12)

**Website:** Canvas website

**Course Description**

This special topics course examines the latest developments in Large Language Models (LLMs) through lectures, seminar-style case study discussions and hands on demos, covering LLMs' business applications, underlying architecture, and the ethical implications of their use.

**Learning Objectives**

- Understand the principles of prompt engineering and how to effectively communicate with LLMs to achieve desired outcomes.
- Learn to interact programmatically with LLMs through APIs and local LLM model serving.
- Understand when to use Retrieval Augmented Generation (RAG) versus supervised fine-tuning techniques for custom LLM use cases.
- Address aspects of safety and alignment in LLM development and deployment, focusing on strategies to evaluate model performance through “evals”.
- Discuss the ethical implications and security concerns associated with LLMs, including privacy, misuse, and the broader impacts on society.

**Course Materials**

Handouts, slides, assignments, and additional helpful resources will be posted on Canvas.

The materials including presentations, cases, articles, and other readings will be uploaded to Canvas or shared in class by the instructor.

## Grading

Component	Percentage
<b>Individual Assessment (30%)</b>	
Online mid term exam (week of October 10th)	20%
Quizzes (4 unannounced, in-person quizzes, 1 lowest dropped)	10%
<b>Participation (35%)</b>	
Attendance & Class Participation (2 unexcused absences allowed; 0.5% off each additional)	10%
Canvas Video Reflections (4 video reflections on Canvas, each 2.5%)	10%
2 class led case study discussions / presentations (each worth 7.5%)	15%
<b>Class Project (35%)</b>	
Project Milestones (instructor / peer graded)	10%
Final Project deliverable + presentation (instructor / peer graded)	25%
<b>Total</b>	<b>100%</b>

Final letter grade will be calculated based on the following scale:

A: 90 and above; B: 80-89.9; C: 70-79.9; Under 70 is U

The course grades are posted on Canvas for informational purposes only. The official overall grade is computed and kept in the instructor's grade book.

## Textbooks

Optional but highly recommended (readings will be provided via Canvas):

- **Janna Lipenkova**, [The Art of AI Product Management: A guide for product managers](#) (under development), \$24
- **Christopher Brousseau and Matthew Sharp**, [LLMs in Production: From language models to successful products](#) (under development), \$24

## Quizzes

There will be 4 unannounced, in person quizzes. These quizzes will be on the class' case study assigned readings. Quizzes will only be possible on the eight case study classes. Their intention is to ensure students completed the assigned readings.



The lowest quiz grade will be dropped (only 3 will be kept). It will be a paper 5 question quiz and no other resources may be used (no computer, calculator). No late submissions (e.g., if you miss class you cannot make up). Quizzes will generally be administered after the break but before case study discussions.

### **Exams**

The mid-term exam will be online using Canvas and Locked Down Browser. You may use notes and textbooks (hard notes) but you cannot use any other online resource (including ChatGPT, LLMs, etc.)

If the answer to an exam question is disputed, the student should submit a written appeal, citing the source to the instructor. The instructor will take these appeals into account during grading.

### **Missed exams**

In the event that the excuse **is approved before the exam date** (a rare case and requires documentation), the student will be given a make-up exam.

**All changes in assignments or schedules will be posted on Canvas. It is your responsibility to keep up with the changes that are posted on Canvas.**

### **Video Reflection Forum**

Students will be assigned to watch a 1 hour (typically) video and required to write a response via Canvas' discussions (200-300 words) reflecting on the discussion. Video reflections will be due 11:59pm on the night before the next class as those reflections will be used in-class discussion for part of the next class.

### **Final Project**

Students will complete projects in groups of four. Details will be provided on Canvas. There will be three project milestones (Sept 12, Oct 24 and Nov 21) and a project presentation on the final exam date (Dec 12).

### **Student-led case study (articles) discussion / presentations**

Students will present twice in class in groups (same project roles, not project groups) discussion based on at least 3 articles for that class. Presenters are expected to develop presentation materials – slides, handouts, demos – and expected to facilitate a class discussion on the articles for 45-60 minutes.



Excused absences will be permitted to create a 10 minute video that presents one of the articles as an alternative. Unexcused absences will have one week to do the same on one of the articles not covered, but at a 25% point off. If not turned in one week after, the student will receive a zero.

## **Class Policies**

### **Attendance and Participation Policy**

5% of the final grade is allocated to case reading discussions and class attendance. Permitted two unexcused absences. Every subsequent absences will result in 0.5% of 5% Attendance grade. Excused absences must include medical documentation and/or pre-approved by instructor (e.g., work related).

The students are required to read the case studies before the class and are highly encouraged to contribute to the case discussions in class. Other contributions to the class, including sharing personal experiences related to data science and business analytics, managerial insights, theoretical opinions are all desirable as well. Attendance and participation are required and tardiness or early departure is disruptive and is, of course, discouraged. Students will be held responsible for any material covered, announcements made, assignments passed out, and any other type of work that they may miss during any absence from class.

### **Attending class via video is not permitted**

Given the importance of in-class participation in this course, zoom or other video will not be provided for students to attend in lieu of in-class participation. The reasoning is that it is nearly impossible to facilitate an in-person class discussion while making it available (sound/video) via zoom. If you do not think you can attend this course in person and consistently, please consider an alternative course as this course may not be a good fit for you.

### **Late work**

Video reflections and project deliverables will have a 25% per day penalty for lateness, yielding a zero if not turned in after four days after the assignment due date.

### **Laptop Requirement**

Students are required to have their personal laptop computer. The policy and the minimum system requirements are found at the link <https://belkcollege.uncc.edu/laptop-policy>.

### **Class Behavior Policy**

Inappropriate behavior distracts from the ability of others to profit from their in-class experience. Such behavior includes arriving late, leaving early, talking, surfing the net, and so on.



Rude and inappropriate behavior **will not be tolerated**. Since it is my responsibility to provide an environment that is conducive to learning for everyone in the class, I will deduct points from the grade of any student who chooses to repeatedly distract others. In particularly egregious cases, I will have the student permanently removed from the class.

Under no circumstances will students be permitted to spend their lab time working on assignments for other classes, checking e-mail, surfing the Web, or printing out homework. Attempts to engage in such behavior will be reflected in lower grades and may lead to removal from the course.

### **Electronic Devices in Class**

Use of cellular phones, pagers, music players, radios, and similar devices is prohibited in the classroom and laboratory facilities. Cellular phones **MUST BE TURNED OFF DURING CLASS**, except in cases of medical emergencies. Pagers must be set to vibrate, rather than beep. Calculators and computers are prohibited during examinations and quizzes, unless specified. Laptop-size computers may be used in lectures for the purpose of taking notes. **Use of instant messaging, email, or other communication technologies during class time is prohibited.** Use of computing devices for purposes other than those required for the purposes of the class topic is prohibited. This includes the use of laptops, lab computers, phones, or other devices for Internet browsing, game playing, reading news, texting, chatting, IM and other activities not required for the class.

### **Grade Appeals Policy**

If you believe that the grade you received on an assignment or an exam was in error or unfair, you can appeal to the professor **in writing within 3 calendar days after the grades are posted**. The appeal should clearly state the reasons why you believe the grade to be unfair or the nature of the error. Overdue appeals will not be considered.

### **Academic Integrity**

As a program that helps to create business and government leaders, the College of Business has an obligation to ensure academic integrity is of the highest standards. Standards of academic integrity will be enforced in this course.

University regulations will be strictly enforced in all cases of academic irregularities, cheating, plagiarism or any variations thereof. Students assume full responsibility for the content and integrity of the academic work they submit. The guiding principle of academic integrity shall be that a student's submitted work, examinations, reports, and projects must be his/her own work.

All UNCC students have the responsibility to be familiar with and observe the requirements of The **UNCC Code of Student Academic Integrity** (see the Catalog and also <http://integrity.uncc.edu/>). This code forbids cheating, fabrication or falsification of information, multiple submission of academic work, plagiarism of written materials and software projects, abuse of



academic materials (such as library books on reserve), and complicity in academic dishonesty (helping others to violate the code). Additional examples of violation of the Code include:

- Representing the work of others as your own.
- Using or obtaining unauthorized assistance in any academic work.
- Giving unauthorized assistance to other students.
- Modifying, without instructor approval, an examination, paper, record, or report for the purpose of obtaining additional credit.
- Misrepresenting the content of submitted work.

Students are expected to report cases of academic dishonesty they become aware of to the course instructor who is responsible for dealing with them.

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.

Students who violate the code can be punished to the extent of being permanently expelled from UNCC and having this fact recorded on their official transcripts. The normal penalty is zero credit on the work involving dishonesty and a further substantial reduction of the course grade. In almost all cases, the course grade is reduced to "F."

If you are unclear about whether a particular situation may constitute an honor code violation, you should meet me to discuss the situation. Feel free to discuss the definition of cheating and/or plagiarism with me if you are unclear on these terms or have questions about the acceptability of a particular type of action.

The instructor 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.

### **Disability Accommodations**

UNC Charlotte is committed to access to education. If you have a disability and need academic accommodations, please provide a letter of accommodation from Disability Services early in the semester. For more information on accommodations, contact the Office of Disability Services at 704-687-0040 or visit their office at Fretwell 230.

### **Diversity**

The Belk College of Business strives to create an inclusive 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.



### **Incomplete Grade Policy**

Receiving a grade of incomplete (“I”) is not based solely on a student’s failure to complete work or as a means of raising his/her grade by doing additional work after the grade report time. An incomplete grade can be given only when a student has a serious medical problem or other extenuating circumstance that legitimately prevents completion of required work by the due date. In any case, for a student to receive an 'I' grade, the student's work to date should be passing, he/she must have completed a significant portion of the course, and the student must provide proper written proof (e.g., a doctor's note) of the extenuating circumstances.

### **Course Changes Policy**

The instructor reserves the right to make any necessary changes to the course content, schedule, and policies. Changes will be announced in class and will also be posted online.

### **Religious Accommodation for Students Policy**

The instructor will observe University Policy 409 (<https://legal.uncc.edu/policies/up-409>) on matters of religious accommodation. Please note that the procedure prescribed by this policy requires a notice to the instructor prior to the census date of the semester (typically the tenth day of instruction).

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### **University's statement on disability accommodations**

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### Tentative Class Schedule

This tentative schedule is subject to change

1. **August 22: Introduction to Large Language Models (LLMs):** Introduction to the course, objectives, and expected outcomes. Accessing and querying common LLM APIs and local (open) models.
2. **August 29: AI Applications and Tasks \*\*:** Introduction to AI applications, tasks and ideas for developing LLM products.
3. **Sept 5: Prompt Engineering \*\*:** Techniques for effective prompt design to elicit desired responses from LLMs.
4. **Sept 12: No class / Project Milestone 1**
5. **Sept 19: LLM Fundamentals \*\* :** Overview of prominent LLMs, understanding components such as tokenization, embeddings, transformers, and attention mechanisms.
6. **Sept 26: Retrieval-Augmented Generation (RAG) \*\* :** Introduction to information retrieval including inverted index, BM25, distance measures (e.g., cosine similarity), and how to integrate into a simple RAG system.
7. **Oct 3: LLM UX and RAG Part 2 \*\* :** Understanding how UX design for LLM products and how RAG works beyond Naive like vector databases, query expansion, Reranker, and function calling.
8. **Oct 10: No Class - Online Exam / Project Milestone 2**
9. **Oct 17: LLM Fine-Tuning: When to Use it? \*\*** Methods for customizing LLMs to specific tasks and datasets through supervised learning techniques (e.g., PEFT techniques like LoRa and QLoRa)
10. **Oct 24: Implementing LLM Fine Tuning:** Use `axolotl` and `modal` for GPU training to explore fine tuning
11. **Oct 31: LLM Data Curation, Evaluation & Benchmarks: \*\*** Methods for evaluating LLM performance, with benchmarks, metrics, and data curation (e.g., generating synthetic data).
12. **Nov 7: Deploying LLMs in Production \*\*:** Best practices for deploying LLMs in real-world applications, including considerations for scalability, efficiency, and maintenance.
13. **Nov 14: Ethics and Societal Impacts of LLMs \*\*:** Critical discussion on the ethical implications of LLMs, including bias, security, privacy, and societal impact. Exploration of guidelines and frameworks for ethical AI use.
14. **Nov 21: No class — Group Check-in Meetings / Project Milestone 3**
- No class Nov 28 (Thanksgiving) or Dec 5 (Reading Day)**
15. **Dec 12: Final Project Presentations:** Students present their final projects, showcasing their ability to apply LLMs to real-world problems.

**\*\* Indicates student led case study discussions on this class date for part of the class.**