CS 8001 OAA Syllabus

Agentic AI Essentials

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Instructor Information

Instructor of Record: Ana Rusch, ARusch3@gatech.edu

Primary Instructors: Sinh Tran, stran63@gatech.edu

General Course Information

Description

AI represents the next evolution beyond traditional chatbots and Large Language Model (LLM)- based assistants, empowering AI systems to reason, plan, and take actions autonomously. Unlike standard LLMs that passively respond to user inputs, Agentic AI follows a four-step process: it perceives information from multiple sources, reasons through complex tasks, acts by executing plans, and continuously learns from its interactions. This seminar combines a series of NVIDIA-sponsored workshops with graded discussion and structured reflection activities, offering learners from all backgrounds a hands-on introduction to Agentic AI. No prior AI experience is required, and the emphasis is on practical application rather than theoretical depth. Students will gain experience with prompt engineering, large language models (LLMs), retrieval-augmented generation (RAG), tool calling, and ReAct (Reasoning and Acting) frameworks to build scalable, interactive AI systems using pre-trained models. Each workshop offers the opportunity to earn an official NVIDIA certificate of competency upon successful completion.

Course Learning Outcomes

Upon successful completion of this course, you should be able to:

1. Apply prompt engineering techniques to build generative, analytical, and conversational LLM applications using popular frameworks.
2. Utilize pre-trained encoder and decoder LLMs for tasks such as semantic search, classification, and content generation.
3. Design and implement Retrieval-Augmented Generation (RAG) agents capable of document reasoning, stateful dialog, and structured outputs

4. Orchestrate agentic AI systems using popular tools to support concurrent, multi-step execution of tasks with integrated tool use.
5. Reflect critically on the limitations, opportunities, and broader implications of deploying agent-based AI in real-world contexts through structured learning reflections and peer dialogue.

Required Course Materials

- Platform: Canvas (assignments & calendar), Ed Discussion (announcements & forum), MS Teams (Office Hours)
- Workshops: Provided via NVIDIA DLI platform using event codes
- Resources: Python notebooks, slide decks, and cloud GPU access (limited time)

Course Requirements & Grading:

This is a Pass/Fail seminar with a fully online format designed around active engagement, reflection, and experiential learning. Students are expected to engage with the seminar through asynchronous discussions and learning reflection assignments. Workshops are optional and provided to enhance your learning experience but are not required for passing.

Prerequisites

• Python: Beginner level
• Jupyter Notebook: Recommended but not mandatory

Technical Setup (for Optional Workshop Participation)

To ensure a smooth learning experience, please complete the following steps before the first OH:

1. NVIDIA Developer Program Account
    a. Ensure you can log into your NVIDIA Developer Program account∗.
    b. If you do not have an account, create one before the workshop begins. You can use any email address to create the account; it does not have to be your Georgia Tech emailThis account provides access to the latest DLI training .
    c. materials during and after the workshop.
2. WebSocket Test
    a. Visit websocketstest.courses.nvidia.com† and ensure all three test steps are checked “Yes.”
    b. If any issues arise:

i. Update your browser.
ii. Note: Only Edge, Chrome and Firefox are supported.

Grading

To pass, students must accumulate at least 8 out of 10 possible points:

• Quiz (2 total): 1 point each (2 total)
• Discussion Participation (4 total periods): 1 point each (4 total)
• Learning Reflection Writeup (4 total): 1 point each (4 total)

Passing Criteria:

• Students may miss at most 2 points.
• If 3 or 4 points are missed, students may complete peer review activities for one or more of the writeup assignments to regain eligibility to pass (subject to instructor review).
• Missing more than 4 points results in automatic failure.

Peer review is optional but encouraged for all students. Participating in peer reviews of writeup assignments enhances the seminar's collaborative environment and may provide a recovery path for students who miss multiple points.

Workshops Overview

This seminar includes access to four NVIDIA-sponsored workshops. While entirely optional, they provide valuable hands-on experience with cutting-edge agentic AI development tools and concepts.

Each workshop offers:
• Materials: Presentation slides (PPTX), Python Jupyter notebooks lab, and datasets.
• Access Requirements: Students need an event code to access the materials on the NVIDIA DLI platform. See Assignments on Canvas for more details.
• Time Constraints: Event codes are issued at the start of the corresponding OH. Students must activate their event code within 24 hours and complete all workshop activities (including earning the certificate) by the assignment's due date. Workshops also include limited GPU hours, which require careful management.

To make the most of your cloud GPU resources:
• Pause GPU: Pause the cloud GPU when not actively using it to avoid running out of time.
• Save Work Locally: Paused GPUs do not retain modified content, so students must save their work locally to avoid data loss.
• Plan Ahead: Allocate long, uninterrupted working blocks to minimize delays, as GPU provisioning can take up to 20 minutes.

See also Workshop Workload and Certificate Sharing.

The following is a list of the available workshops:

1. Building LLM Applications With Prompt Engineering (PRMPT)
    a. Learn to apply iterative prompt engineering best practices to solve language-related tasks.
    b. Use LangChain with Llama-3.1 NIM models to build LLM workflows for document analysis, generation, and chatbot interactions.
2. Rapid Application Development with LLMs (RAD)
    a. Explore the LLM ecosystem including encoder and decoder models from HuggingFace. Build apps using semantic search, embeddings, classification, and generative pipelines. Orchestrate workflows using LangGraph and LangChain.
3. Building RAG Agents with LLMs (RAG)
    a. Implement RAG agents capable of document reasoning and stateful interaction. Learn dialog management, embedding-based retrieval, guardrailing, and deploying modular LLM pipelines.
4. Building Agentic AI Applications with LLMs (AAI)
    a. Design agent systems that integrate reasoning, tool use, and multi-agent orchestration. Create structured outputs, interface with APIs, and manage resilient, concurrent workflows using LangGraph and software engineering best practices.‖
5. Workshop Workload
    a. Students should dedicate 8 hours per workshop, covering preparation before and hands-on work after OHs. This includes reviewing materials, coding exercises, and submitting the final project to earn the NVIDIA certificate. During this time, students can use Ed Discussion to ask for help from peers and the instructor. Workshops are optional and not required for course credit or passing.

Participation

Participation is flexible and inclusive of different learning styles.

You may:

- Engage in discussion threads on Ed Discussion
- Share your ideas and reflect on key concepts from the workshop
- Do peer review by reading and responding to a classmate's writeup assignment
- Join live or watch recorded OHs, corresponding to each of the four workshops:
    a. OH Workshop
        i. PRMPT
        ii. RAD
        iii. RAG
        iv. AAI

- Students are encouraged to lead a discussion by proposing a topic or post related to Agentic AI, a current event, or academic research on Ed Discussion.
- Discussion forums are an important part of this seminar. Each discussion window is worth 1 point (4 total), and contributes to the overall point-based grading system outlined above. Optional threads on Ed Discussion allow students to share and celebrate their achievements, such as earning certificates or achieving impressive metrics. Participation in these threads is encouraged to promote a ”can-do” attitude and foster a sense of community. However, sharing is entirely optional to respect individual privacy preferences.

Final Projects and Certification

- Criteria: Each workshop has a separate final project involving coding, tuning hyperparameters, and achieving specific AI metrics (e.g., accuracy). Projects are not graded, but completing them benefits students by earning NVIDIA certificates.
- Submission: Workshop final projects must be completed within 5 days of activating the event code, which must itself be activated within 24 hours of being issued. These projects are entirely optional and not required for passing the course. Assignment due dates on Canvas are provided for students who choose to complete a project and wish to share their certificate.
- Certification: NVIDIA certificates are issued automatically upon successful final project completion. Certificate is optional and does not count toward the grade https://learn.nvidia.com/courses/course-detail?course_id=course-v1:DLI+C-FX-25+V1

Certificate Sharing

- Sharing/Submitting certificates is optional but encouraged. Students can choose one or more of the following options:
    - Share on Ed Discussion: Post your certificate in the optional thread to celebrate your success and let peers see your achievement. This fosters motivation and a sense of community.
    - Submit on Canvas Assignment: Upload the URL to your certificate via the corresponding Canvas assignment. This enables the instructor to analyze participation and completion metrics. Submissions on Canvas are private and not visible to other students.
    - Do not share: If you prefer, you can opt not to share your certificate on either platform. Sharing/Submitting is not mandatory but is strongly encouraged to celebrate achievements and support seminar engagement.

Course Policies

Communication Policy

- Use Ed Discussion for all course-related communication.
- When starting a new thread, choose the appropriate type:
    - Question: Use when seeking an answer or help from instructors or peers.
    - Post: Use when sharing insights or starting a conversation that does not require an answer.
    - Do not use ”Announcement” — this is reserved for instructional staff only.
- Public threads are encouraged for general questions that may benefit other students.
- Private threads are intended for personal and.or sensitive matters. When posting privately, make sure to select ”Question” as the thread type — choosing ”Post” instead may cause your message to be missed by the instructional staff.
- You are responsible for checking both your GT email and Ed Discussion at least once every 48 hours for important announcements or messages from the teaching team. This is especially important if you are engaged in ongoing communication with the instructional staff.
- MS Teams may be used for peer discussions during OH.
- Respect others’ privacy and avoid inappropriate or uncollegial posts. Posts that violate guidelines will be removed.
- To ensure productive and respectful interactions:
    - Stay On-Topic: Focus on course-related content. Avoid discussing unrelated personal matters or tangential topics that don’t benefit the seminar.
    - Be Respectful: Disagree constructively, without personal attacks or dismissive comments. Acknowledge differing viewpoints courteously.
    - Be Clear and Concise: Use precise language to convey your points effectively. Avoid overly lengthy posts that can dilute the message.
    - Avoid Sharing Final Solutions: While collaborative discussion is encouraged, do not share final project solutions. Provide guidance or hints instead.
    - Maintain Privacy: Do not post personal or sensitive information about yourself or others. Use private posts for personal questions.
    - Contribute Meaningfully: Aim to add value with every post or reply. Share unique insights, ask thoughtful questions, or build on others’ ideas.

Recording Policy

- Recordings of OHs are provided by the instructor. Personal recordings are not allowed without accommodation documentation.

Religious Observances

- Notify the instructor within the first two weeks of any planned absences due to religious observances.

Feedback and Surveys

- Post-Workshop Feedback: Survey results are accessible ONLY to NVIDIA DLI and NOT to Georgia Tech or the instructor. Students are encouraged to use the built-in survey tool after each workshop to provide feedback directly to NVIDIA DLI. If you feel that the workshop was valuable, consider rating it highly to help reinforce the program's recognition and support. For detailed suggestions or constructive feedback, please use the CIOS survey at the end of the seminar, as it has a direct impact on refining the course and seminar offerings at Georgia Tech. CIOS Feedback: Anonymous results from the Georgia Tech CIOS survey are available to both the instructor and Georgia Tech, but are not shared with NVIDIA. Completing this survey is equally important, as it provides detailed and constructive feedback that supports the seminar's inclusion in the curriculum and future improvements. Students are encouraged to utilize the free-text feature in the CIOS survey for specific suggestions, as this is the primary avenue for refining the course. You feedback directly influences the seminar's success and continued offering

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.