15.S04 - Generative AI Lab

Action Learning Seminar on Generative AI, its Applications, & the Digital Economy

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Office hours by appointment; 12 credits

Class Times   Tuesdays & Thursdays 4:00-5:30pm, E51-345

TAs:
- Jaeyoon Song (jaeyoons@mit.edu - Head TA)
- Feliks Vaksman (vaxmanf@mit.edu - Grading & Project TA)

Administrator: Meagan Combs combs@mit.edu

OVERVIEW

The rapid advancement of generative AI technologies is transforming decision-making and innovation across industries. Organizations worldwide are grappling with the challenges and opportunities presented by these powerful new tools. We are at the forefront of a new era in artificial intelligence that offers unprecedented potential for both individuals and businesses.

The purpose of Generative AI Lab is to pair student teams with cutting-edge projects involving generative AI technologies as they apply to real-world challenges and opportunities. The focus of these projects is on strategic implementation and practical application, emphasizing how generative AI can drive innovation and solve complex business problems. By the end of the semester you will have coded a working end-to-end prototype that builds on top of the LLM APIs to solve a real problem your host company is facing. You will bid on the projects you are most interested in so we can match student groups appropriately.

Key objectives of the course include:

1. Provide students with hands-on experience in applying generative AI tools to solve real business challenges.
2. Develop strategic thinking skills in identifying and leveraging generative AI opportunities within organizations.
3. Foster an understanding of the current capabilities, limitations, and technical considerations of generative AI technologies.
4. Expose students to a variety of industries and use cases for generative AI, broadening their perspective on its potential applications.
5. Get hands-on experience with methods and tools such as Claude Code, Cursor, Gemini Pro, Ollama, RAG, etc.

Students are expected to be proficient in either Python or Typescript so they can contribute meaningfully to their team. Capped at 120 students.

GRADING
Grades will be calculated using the following breakdown*:
- 63% Team-wide
  - 26% final report and deliverable (working GitHub code the TAs can run)
  - 25% final presentation content and delivery
  - 8% mid-point presentation content and delivery
  - 4% project plan and project selection timeliness
- 37% Individual
  - 19% peer team project eval for your peers
  - 15% attendance and participation in classes (see policy below on attendance for special class sessions)
  - 3% in-class exercises

COURSE PRINCIPLES & EXPECTATIONS:

The primary criterion for projects is to provide a learning experience for the students. In addition, the projects should be of high relevance and interest to a particular organization and senior managers in it.

Project teams of **four students** are expected to work independent of regular class meetings. Project sponsoring organizations will cover costs of travel and lodging, if any (as approved independently by the sponsor organization). Each project team will have an MIT-associated faculty member, alumni, or industry mentor to provide guidance and assistance.

Two special sessions are scheduled: Pitch Day on February 5th and Final Presentations on May 13th. **Attendance at both sessions and the 2 midterm presentation classes is required or will cost a half letter grade (5%) each.**

Several skills-based sessions will be available during the semester, where students will have the opportunity to learn more about relevant LLM techniques and address issues they are confronting during the course of project work. Attendance is strongly encouraged.

Laptop and phones
There are times when we'll want you to use your laptop and times when we'll want them closed. Primarily, when other people are talking, and we are in a discussion, laptops should be closed. This ensures that our attention is focused on the topic and on each other. Please keep your phone in your pocket or face down.

On class participation
We reserve the right to cold-call. We know people don't always like this, but it's a good way to hear from different voices. But you can always pass if you want to.

2026 SCHEDULE

Day	Session	Host
T 2/3	Welcome & Intro to Generative AI Lab	All
Th 2/5	Sponsor Project Pitch Day (4:00-7:00 PM @ Sala de Puerto Rico)	All
T 2/10	Full Stack Bootcamp I: Building a Full Stack App Guest: Artem Lukoianov (Founder of Sundai Club) *NDA and Data Security Discussion	Bakker *Ellen Baum
Th 2/12	Problem Framing & Use Case Identification	Horton
No Class (Monday schedule on 2/17)		
Th 2/19	Full Stack Bootcamp II: Vibe Coding Best Practices Guest: Nash Gadre (Founder, Camouflage Networks)	Valicenti
T 2/24	Full Stack Bootcamp III: LLMs and Agent Tools Guest: Andrew Mead (Founder of Vector Lab)	Valicenti
Th 2/26	Full Stack Bootcamp IV: APIs, Backend, and Deploying Your Prototype Guest: Artem Lukoianov and Mike Boensel (Sundai Club)	Valicenti
T 3/3	Using Claude Code Guest: Thariq Shihipar (Member of Technical Staff @ Anthropic)	Bakker
Th 3/5	Building in 2026: Tools, APIs, & Process	Horton
T 3/10	Generative AI Tools & Platforms Overview Guest: Pablo Omenaca (COO, StackAI)	Valicenti
Th 3/12	LLM Mechanics: Prompt Engineering, Context Windows, Hallucinations, Tokens	Bakker
SIP Week - No Class on 3/17		
SIP Week - No Class on 3/19		
Spring Break - No Class on 3/24		
Spring Break - No Class on 3/26		
T 3/31	Augmenting LLM Knowledge with RAG	Horton
Th 4/2	*Midpoint Presentations Part I*	Valicenti

T 4/7	*Midpoint Presentations Part II*	Horton
Th 4/9	Building Robust AI Evals for LLMs and Agents	Bakker
T 4/14	Debugging & Technical Problem Solving	All
Th 4/16	*Working with Unstructured Data / Data labeling* Guest: Robin Horton (CEO, Expected Parrot)	Horton
T 4/21	Working with Synthetic Data	Valicenti
Th 4/23	Debugging & Technical Problem Solving	All
T 4/28	Surprise Guest Speaker!	Bakker
Th 4/30	Debugging & Technical Problem Solving	All
T 5/5	Mechanistic Interpretability & Alignment	Bakker
Th 5/7	Building and Investing in AI Guest: Raphael Schaad (Founder of Cron, Visiting Partner at Y Combinator)	Bakker
T 5/12	Optional Faculty Office Hours / Final Presentation Practice	All
W 5/13	Final Project Presentations (Wed 3:00-7:00 PM @ Wong Auditorium E51)	All

Notes on Class Activities and Due Dates:

- **2/3**: The first session will be followed by an informal huddle to facilitate team formation; pizza will be provided. Please use this time to meet new classmates and see who shares your interests.

- **2/5**, 12:00pm (noon): DUE team formation; each team should submit one document (guidelines posted on Canvas, "Guidelines: Team Formation for Projects") to the TA. In the following days, faculty, mentors, and the course support team will review and confirm the teams.

- **2/5**: On Pitch Day, we will meet jointly with the representatives from project proposing companies. Each will briefly describe their project as proposed, and students will have an opportunity to meet and informally mix with them and fellow students.

- **2/9**, 3:59pm: DUE project bids; each team should complete the survey (link to be distributed via Canvas, where guidelines will also be posted, "Guidelines: Bidding for Projects"). In the following days, faculty, mentors, and the course support team will work out assignments of projects to teams, subject to review by the proposing company.

- **2/10**: Final team-project pairings will be communicated to students. MIT and every proposing company have executed a jointly signed NDA. Each student team member will be required to review and sign an acknowledgment stating that all will abide by the terms agreed to in the NDA. Additional information will follow from Ellen Baum.

- **3/3**, 12:00pm (noon): DUE: project plan; each team should submit one document to their mentor and TA.

- **4/1**, 11:59pm: DUE: mid-point presentation slides; each team should submit their slides to their mentor and TA.

- **4/2 and 4/7**: Student teams will deliver 5 minute presentations on their project work at the midpoint of the term. The chief aim of these sessions is to help illuminate issues common across teams in order to foster collaboration.

- **5/12**, 11:59pm: DUE: final presentation slides; each team should submit their slides to their mentor and TA.

- **5/13**: During the Final Presentations (Wednesday 3:00-7:00pm), each team will present their project work to an audience of experts, entrepreneurs, and executives, including representatives from project sponsoring organizations. Teams will have 5 minutes to present their project work, plus 3 minutes for Q&A and judge remarks (8 minutes total per team).

- **5/15**, 11:59pm: DUE: final report (10 pages maximum, 3000 words, not including figures or references); report should consider feedback received during final presentations on 5/13. Each team should submit one document to their mentor and TA.

*note that peer evals that your teammates give to you can impact partial credit towards your team's team-based assignments

Frequent Q&A's

1. **How to register for the 15.S04 class and get access to class materials on the Canvas site?**
   - **Do NOT use course bidding system…apply via the [application form](#)**
   - **For MIT Students, please follow these steps:**
     - i. **Register online or download a registration form.** Form needs to be signed by John Horton, Michiel Bakker, or Tim Valicenti (TA's cannot sign). Please submit an [add form](#) and email John to ask him to approve.
   - **For NON-MIT Students, please follow these steps:**
     - i. To officially register for this class, ALL students must download, fill, sign (by John) and submit the add/drop form. See above step A under MIT student instructions for additional information.
     - ii. All students must get an @mit.edu email address, which means you need to register for a Kerberos password. Additional instructions: http://ist.mit.edu/start/kerberos#identity. If you have any issues, you can contact the MIT IS&T Help Desk, information below:
       IS&T Help Desk
       E17-110, 40 Ames Street
       Walk-ins: 9AM-5PM, M-F
       Email: helpdesk@mit.edu
       Phone: 617-253-1101 (3-1101)
       Telephone/Online: 8AM-6PM, M-F

2. **What should you do if you registered late for 15.S04?** Please make sure you're fully registered for the class from the registrar. Please read all class announcements and

complete all homework and class assignments as soon as possible. We understand students will be adding the course for the first week of class and TA's will note when you have joined the class. You still MUST also fill out the application.

MIT Action Learning Office's Policies on Data Destruction:

Host companies share confidential and proprietary information to student teams doing Action Learning projects. MIT Sloan has an obligation to destroy that data at the end of the project so that it does not inadvertently get disclosed to unauthorized people and it is not used for any other purpose than the project.

MIT Sloan depends on the student teams for destroying the data in a timely and appropriate manner. Please note that destruction of data is a requisite step for the completion of course requirements.

What data is required to be destroyed?
Any information supplied by a company in any format- emails, notes from a phone meeting, worksheets, records, company documents, any kind of company data. This includes data that is marked confidential and unmarked data. If the company supplied it, it must be destroyed at the end of the project.

What data is NOT required to be destroyed?
Students can keep their final paper and other derivative work that does not include company proprietary or confidential information. If there is any doubt, ask for help to discern what needs to be destroyed.

What are acceptable destruction methods?
- Printed Materials: Documents should be recycled in MIT approved secure recycle bins. Each academic area and many program offices have these bins.
- Digital Data Controlled by Students: If students have the data in Dropbox or on their computer, they must delete the data using appropriate tools.
- Digital Data Controlled by Sloan Technology Services: STS will destroy the data according to MIT Sloan IT policies.

If there are any issues or questions on this issue, please contact Ellen Baum, Contract Administration, at 3-5617 at ebaum@mit.edu or Will Hedglon, STS, at 5-4176 at hedglon@mit.edu.