VIP-OYP- VYP Syllabus

Course Information

Course Prefix and Number: VIP 2601 / 3601 / 3602 / 4601 / 4602 / 4603 / 6601 / 6602 / 6603
Course Name: VIP Brainboost
Instructor: Borela Valente, Rodrigo

Course Description

This VIP explores how generative AI can be used to design educational technologies that make learning more effective, independent, and equitable. Our work addresses both student learning and instructional support: building tools that help students strengthen self-directed learning, critical thinking, and higher-order problem-solving skills, while also creating systems that give instructors and teaching assistants better insight into student progress and challenges.

Course Learning Outcomes

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

- Engage in independent inquiry by breaking down open-ended research problems into tractable questions and designing systematic approaches to investigate them.
- Collaborate effectively in interdisciplinary teams by coordinating tasks, sharing progress, and integrating diverse perspectives.
- Communicate research outcomes clearly through written reports, oral presentations, and visual artifacts aimed at both technical and non-technical audiences.
- Reflect on ethical and societal implications of AI in education, considering issues of equity, access, and student autonomy.
- Adapt continuously by learning new methods, tools, or frameworks as project scope evolves.

Additionally, this course provides opportunities for you to build experience in several of the following technical areas:

- Apply human-computer interaction (HCI) methods such as user interviews, surveys, think-aloud protocols, and co-design workshops to evaluate AI-driven educational tools.
- Draw from cognitive science research to connect tool design with theories of learning, metacognition, and higher-order thinking skills.
- Analyze and interpret educational data using statistical methods, data visualization, and learning analytics to assess tool effectiveness and student outcomes.
- Design and implement machine learning models (unsupervised, supervised and reinforcement learning) for use in adaptive learning systems.

- Integrate front-end and back-end systems to build and test interactive prototypes, dashboards, or recommendation pipelines.
- Evaluating the energy efficiency and sustainability of training and deploying AI systems, and considering trade-offs between performance, cost, and environmental impact.

Required Course Materials

This course does not have any required texbooks. Instead, students will identify educational resources (books, tutorials, etc.) and research papers through systematic literature reviews, as part of their independent inquiry.

Grading Policy

This course uses a fixed grading scale. Grades are not curved. Final grades are calculated to the nearest tenth. Scores are not rounded up. For example, a final score of 89.9 will be recorded as a B, not an A. Scores are calculated using the following assignment category percentages:

VIP Notebook **5%**
Weekly Progress **10%**
Peer Review **5%**
Mentor Review **5%**
Presentations **10%**
- Midterm 1 2%
- Midterm 2 4%
- Midterm 3 4%

Artifacts **60%**
- Artifact 1 5%
- Artifact 2 5%
- Artifact 3 50%

AI Reflections **5%**

Letter Grade Scale:
A 90.0 and above
B 80.0 – 89.9
C 70.0 – 79.9
D 60.0 – 69.9
F Below 60.0

Description of Graded Components

- **VIP Notebook.** All students must maintain an electronic notebook documenting meeting notes (including agendas and action items), a running to-do list, literature review notes with article links, and descriptions of all project contributions. Undocumented work will not be credited. Notebooks are submitted periodically and graded for completion.
- **Weekly Progress.** Individual action items declared in team meetings will be graded approximately weekly for satisfactory completion, earning full, half, or zero credit, with two drops at semester's end. Students are expected to proactively seek help well in advance of check-ins, as last-minute issues will not be excused.
- **Peer Review.** At two points during the semester, students will complete peer evaluations of sub team members on the VIP platform. Instructors reserve the right to reduce grades based on unsatisfactory evaluations, and missed deadlines will result in letter grade deductions.
- **Mentor Review.** Mentors will evaluate students on technical and professional growth, initiative, and quality of contributions through periodic check-ins over the semester. Instructors reserve the right to adjust grades based on unsatisfactory mentor evaluations.
- **Presentations.** Three sub team presentations are scheduled with all members required to present each time. Teams receive a shared grade and feedback covering clarity, delivery, visuals, and engagement.
- **Artifacts.** Students complete three major deliverables submitted at defined points and maintained in the shared GitHub repository, with expectations tailored by sub team. Software students are evaluated on the design, implementation, and documentation of committed features and infrastructure, tracked through pull requests, GitHub Wikis, and release notes. Research students are assessed on three stages of research contributions submitted via GitHub (code, analyses, visualizations) and Overleaf (writing), with each deliverable building toward a complete collaborative paper covering related work, methodology, results, discussion, and conclusion.
- **AI Impact Reflections.** Students will periodically document and critically reflect on their use of AI tools, including self-reporting of assistance, energy consumption, and carbon impact, as well as short written reflections connecting invited talks and project work to relevant UN Sustainable Development Goals.

Attendance Policy

Attendance is required for sub team meetings and class presentations. Failure to participate in the meetings will result in zero credit being assigned to the weekly progress for that day. Failure to participate during the presentations will result in a zero grade for that midterm presentation.

Academic and Research Honesty/Integrity Statement

A central objective of this VIP is to produce work that contributes to the research community through peer-reviewed publications, with authorship determined by the significance of each student's contributions rather than sub team membership. Georgia Tech expects students to act according to the highest ethical standards: manufactured data, falsified results, misleading analysis, plagiarism, and submitting or publishing any VIP findings, data, or technology without explicit instructor permission all constitute violations of the Georgia Tech Honor Code and research ethics, and any suspected misconduct will be reported to the Office of Student Integrity and relevant venues. Handled responsibly, this VIP provides a valuable opportunity to gain authorship experience, contribute to high-impact research, and build credentials beyond the classroom. Students are encouraged to review the Georgia Tech Honor Code:

- The Honor Code — https://osi.gatech.edu/students/honor-code
- Office of Student Integrity — http://www.osi.gatech.edu/index.php/

Artificial Intelligence Policy

We treat AI-based assistance (e.g. ChatGPT, Copilot) the same way we treat collaboration with other people: you are welcome to talk about your ideas and work with other people inside of the class, as well as with AI-based assistants.

With regards to code writing: You are responsible for all code you submit in this course. **While you may use AI tools to assist in writing code, you must ensure that the final implementation is correct, functional, and fully understood by you.** Do not include in your repository any code that you cannot explain or justify. Developing and refining your own implementations is critical for building a deep understanding of algorithms and for preparing you to innovate in the future.

With regards to report writing: You may use AI tools to check or improve spelling, grammar, or sentence phrasing, but you must declare this use in your report in the "Acknowledgements" section. The use of AI to generate multi-sentence portions of text is not permitted. **All ideas, explanations, analyses and conclusions must be entirely your own.** If the instructional team suspects a violation, you may be asked to provide evidence of authorship (e.g., Overleaf edit history). Failure to provide convincing evidence will result in a zero for the project and a report to the Office of Student Integrity.

Core IMPACTS

Does not apply.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, 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 contact the Office of Disability Services

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. This summarizes my expectations for you and what you can expect from me. 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. Expectations of Advisors and Advisees