VIP MATRIX (Makerspace Advancements Through Research, Innovation, and Cross-Collaboration) Syllabus

VX4, Variable Credits

Friday, 11:00 am, TBD

Instructor Information

Instructor Amit Jariwala	**Email** Amit.jariwala@gatech.edu	**Drop-in Hours & Location** MRDC 4503/Link (by appointment)
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General Course Information

Description

The primary goal of this VIP team is to research and develop intelligent systems to manage and maintain makerspaces. The course explores projects at the intersection of Engineering, Human Factors, Technology (software), and Makerspaces (such as the Flowers Invention Studio, Hive, MILL, AMS, etc.) with the central purpose of enhancing the experience of users, staff, and managers of a makerspace. The team merges expertise from electrical engineering (PCB design), data science (time-series analysis), mechanical engineering (design, prototyping & fabrication), computer science (full-stack development), and Artificial Intelligence (LLMs, Machine Vision, etc.). The VIP course works on long-term projects such as those mentioned on this website: https://matrixlab.gatech.edu/research/.

Returning VIP students who previously started work on a project may choose to continue or join another sub-team. If you are a returning student interested in a new sub-team project, you should contact Dr. Jariwala as soon as possible to discuss what is within the course's scope and what is feasible, given timelines and resources.

Pre- &/or Co-Requisites

There are no pre-requisites or co-requisites for this course.

Course Goals and Learning Outcomes

By the end of this course sequence, students will be able to:

1. **Develop research capability through authentic, open-ended projects** related to makerspaces, design, manufacturing, AI, experiential learning, and emerging technologies.
2. **Learn to frame ambiguous problems as researchable questions** and connect project activities to a broader research purpose.
3. **Apply human-centered and evidence-based approaches** when designing, evaluating, and improving technologies, tools, processes, or learning experiences.
4. **Develop competence in iterative prototyping and experimentation**, including designing tests, collecting evidence, analyzing results, and refining solutions.
5. **Contribute effectively to interdisciplinary research teams** through communication, documentation, peer collaboration, mentoring, and shared accountability.

6. **Develop professional and research identity** by reflecting on their contributions, failures, learning, decision-making, and growth over time.
7. **Produce research artifacts that contribute to the long-term work of MATRIX Lab**, including datasets, prototypes, software, design documentation, literature reviews, reports, posters, presentations, and publications

By the end of your MATRIX experience, you should be better able to:

1. **Ask** — Turn an interesting problem into a meaningful research question.
2. **Investigate** — Learn what others already know and identify what remains unanswered.
3. **Make** — Build physical, digital, or process prototypes that help investigate the problem.
4. **Test** — Design experiments and gather meaningful evidence.
5. **Learn** — Use evidence, including failures, to revise your assumptions and approach.
6. **Collaborate** — Work reliably within an interdisciplinary research team.
7. **Document** — Leave behind work that another researcher can reproduce and build upon.
8. **Communicate** — Clearly explain what you did, what you discovered, and why it matters.
9. **Reflect** — Articulate how the research experience changed your skills and thinking.
10. **Contribute** — Advance the MATRIX Lab's research, not merely complete assigned tasks.

Course Requirements & Grading

VIP teams function like real-world project teams. Members work on different aspects of a shared project, ranging from sophomores to graduate students, and from first-time participants to those with multiple semesters of experience. Students may enroll for variable credit hours, which are considered in grading. **Note:** Zero-credit enrollment is reserved for paid participants and follows the same grading criteria.

Grading Overview

Each student is evaluated across three core areas, with three mandatory requirements. Regardless of role or experience, students must demonstrate achievement in all three areas:

1. **Documentation and records** (45%)
    a. Team Member Profiles, website sub-team description and other individual assignments on CANVAS (5%)
        a. Weekly log (10%)
            - Could include GitHub documentation and/or Word documents on Team's SharePoint
            - All relevant items (Scope document, MVP docs, Final report, or other docs) must be published to the GitHub by the final upload date, or it will be considered incomplete.
        b. Final Deliverable
            - MVP (standalone demonstration of the team's contributions which can be an app, website, hardware product, etc.) (20%)
                - Prepare a specification sheet and/or scope document by week #5. The success of the MVP would be graded against the proposed specification sheet.
            - Final Report that clearly states individual contributions for the technical report and the MVP (10%)
                - All relevant items (Scope document, MVP docs, Final report, or other docs) must be published to the GitHub by the final upload date, or it will be considered incomplete.
2. **Personal accomplishments and reflection (**15%)
    a. End of Semester Reflection on CANVAS (10%)
        - Pursuit of knowledge necessary for project
        - Contributions to the technical progress of the team
        - Engagement in project
    b. Peer Review of Draft Report (5%)

c. More experienced team members may be expected to contribute to the management of their projects.

3. **Teamwork and interaction** (40%)
    a. On-time attendance in meetings (10%)
    b. Midterm and Final Peer Evaluations. (10%)
    c. This is a web-based form, and you will receive an email from https://vipvx4.edusourcedapp.com/ to complete the peer evaluations using your GT credentials. **Failure to complete the peer evaluation will result in a full letter grade deduction. Late submissions are not accepted.**
        - See the preview of the peer-eval form here: https://vipvx4.edusourcedapp.com/survey_templates/3022/preview
    d. Team Presentation(s)
        - Sub-Team's Final Presentation (10%)
        - Individual Presentations and Engagement throughout the semester (10%)

Rubric

Rubrics will be published with their respective assignments.

Grading Scale

Your final grade will be assigned as a letter grade according to the following scale:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

Course Materials

Course Website and Other Classroom Management Tools

1. Visit Canvas for assignments (i.e. Weekly Logs).
2. Join the MS Team per instructions on Canvas and pin the semester's channel.
3. GitHub: https://github.com/GeorgiaTech-DDI
4. Visit https://vipvx4.edusourcedapp.com/ for Peer Evaluations (and you may skip the automated peer eval request from vip.gatech.edu)
5. Join the MS Teams and pin the semester's channel: General | VIP-VX4 MATRIX

Course Policies, Expectations, & Guidelines

VIP is a collaborative, multidisciplinary, project-based learning and research experience. Your success in this course depends not only on your technical contributions but also on your active engagement with your team and the broader learning process.

Your Role in the Learning Process

As a VIP student, you are expected to:

- Take initiative in exploring and applying knowledge relevant to your project.
- Collaborate effectively with team members across disciplines and experience levels.
- Document your work thoroughly.
- Reflect on your learning and contributions throughout the semester.

This course is a real-world team environment, where learning is dynamic, self-directed, and collaborative. Your growth depends on your willingness to engage, contribute, and learn from others.

Team Meetings and Participation

Attendance and active participation in **team meetings** and **sub-team meetings** are required. These meetings are essential for:

- Coordinating project tasks and timelines.
- Sharing progress and receiving feedback.
- Learning from peers and mentors.
- Contributing to team decisions and direction.

Failure to attend meetings without valid reason may negatively impact your grade and your team's progress. If you anticipate missing a meeting, communicate with your team and advisor in advance.

Use of External Resources

You are encouraged to consult external sources to support your learning and project work. However:

- Do **not present someone else's work as your own**.
- Always **cite and reference** external materials used in your notebook, code, presentations, or other deliverables.
- Proper attribution is essential to maintain transparency and integrity in a collaborative research environment.

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 plagiarizing 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.

Attendance and/or Participation

In-person attendance is expected during all class meeting times. If, for some reason, the class is moved to a virtual meeting, then students are expected to participate fully.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Please submit the Institute Approved Absence Note to request an extension or to be excused for an absence.

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.

Additional Course Policies

VIP Room and Equipment Use Policy

VIP rooms and equipment are shared resources used by multiple teams. To ensure a productive and respectful working environment, the following rules apply:

1. Room Usage Priorities

Room use is prioritized as follows:

1. Scheduled team meetings, lectures, and learning modules
2. Weekly sub-team meetings (multiple groups may share the space)
3. Video conferences or special meetings with VIP stakeholders
4. Other project-related work (multiple groups may share the space)

Room schedules are available on the VIP website.
Note: A "good neighbor" policy applies—students may use rooms during other activities as long as they do not cause disruption. Quiet individual work or studying is allowed when it does not interfere with scheduled uses. Similarly, multiple groups may use a VIP room at the same time.

2. Cleanliness and Conduct

- Everyone is responsible for keeping rooms clean.
- Food is allowed, but spills must be cleaned immediately.
- **Gum must be disposed of properly—do not stick it under desks or on carpets.**
- Rooms are monitored by cameras; violations may be reviewed via video.

3. **Equipment Use**

- Equipment may be designated for general use or assigned to specific teams.
    - General use examples: Projector in Klaus 1440, monitors in VL 465 and VL 463B.
    - Equipment assignments may change each semester.
- If unsure about equipment access, contact: vip-request@ece.gatech.edu
- Use equipment only for its intended purpose. Misuse may pose safety risks.

Important Equipment Rules:

- Equipment may not be removed from VIP rooms without a signed loan agreement approved by a VIP Director.
- You are financially responsible for any equipment not returned in good condition.
- You must know how to operate equipment safely. Approval to use equipment does not imply safety training has been provided.

4. Computer Accounts

- Accounts are for individual use only—do not share with others.
- All usage must comply with Georgia Tech, USG Board of Regents, and State of Georgia policies.
- Respect privacy and data integrity. Having access to a file does not mean you are authorized to read or modify it.

5. BuzzCard Access

- Access is a privilege and is logged.
- Rooms are under video surveillance. In cases of theft, vandalism, or messes, logs and footage will be reviewed.
- Do not allow unauthorized individuals into VIP spaces.
- Always secure the room (close the door) when leaving.

Campus Resources for Students

Undergraduate Student Academic Success Resources:
A list of resources for undergraduate students' academic success and information about advising can be found at Success at Tech.

- 1:1 Tutoring: Students looking for additional assistance outside of the classroom are advised to consider working with a peer tutor through Knack. Georgia Institute of Technology has partnered with Knack to provide students with access to verified peer tutors who have previously aced this course. To view available tutors, visit gatech.joinknack.com and sign in with your student account.

Graduate Student Academic and Professional Success Resources:
A list of resources for graduate students is given on the Office of Graduate and Postdoctoral Education website. Specific information for current graduate students includes

- Academic Resources such as the Communications Center, Language Institute, Library, Catalog, Registrar, resources for conducting research, Advocacy and Conflict Resolution resources, and how to manage unexpected situations that may impact your academic performance;
- Student Resources such as Campus Services, Child Care/Family programs, Health & Wellness, Career Services, and the Student Resource Guide; and
- Professional Development such as the programming from the Career Center and other professional development resources and events"]

Student Well-Being:
At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being (student-resource-guide (gatech.edu)