VIP Secure Hardware Syllabus

VIP 4602 VPM, 2 Credits, Spring 2027
Wednesdays, 5pm-5:50pm, Klaus 2350

Instructor Information

Instructor
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General Course Information

Description

The goal of the VIP Secure Hardware team is to design microchip hardware that is highly resistant to malicious attack and reverse engineering. The issues involved or addressed include redesign of the logic structure of hardware to resist reverse engineering; memory leakage and run-time attacks; design of block ciphers for encryption and authentication; duplication of digital logic in a non-obvious manner; and mathematical proofs of algorithmic complexity and security properties.

Pre- &/or Co-Requisites

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

Learning Outcomes

Through VIP students will achieve the following:

1. Learn and practice professional skills.
2. Make substantial contributions to the team project.
3. Experience different roles on a large, multidisciplinary team.

Course Requirements & Grading

VIP teams function similar to 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:

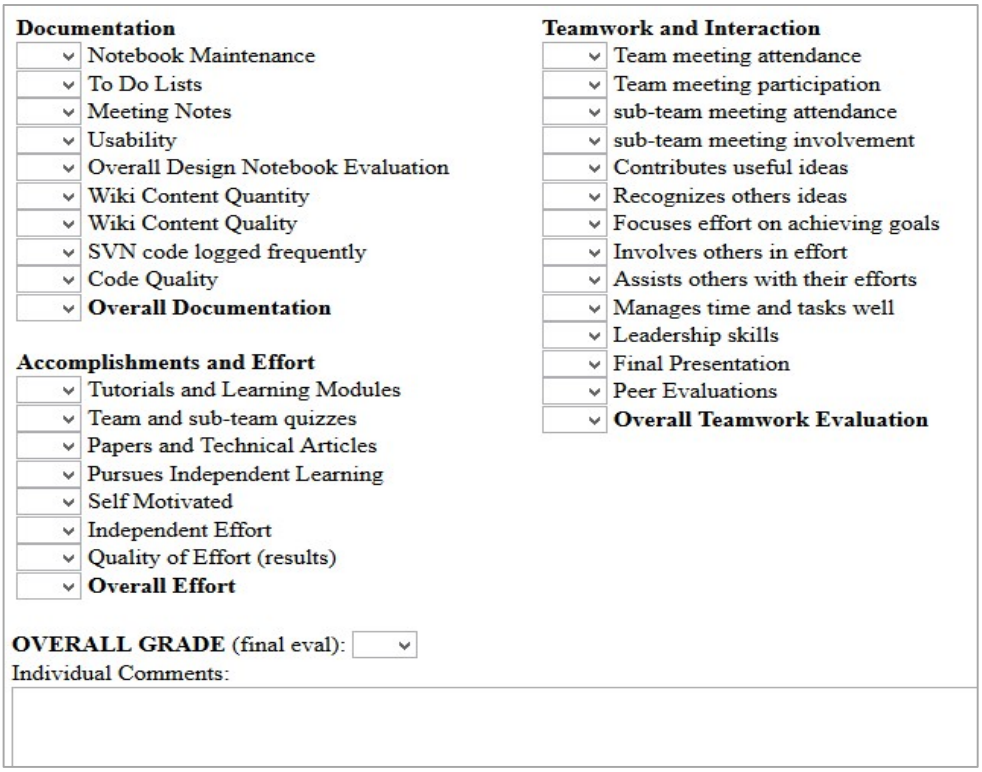
1. **Documentation and Records (33%)**
   - Maintain individual documentation (required).
   - Contribute to team documentation: slide presentations and final report.
   - Code (via GT GitHub) if team is developing software and/or hardware code.

2. **Personal Contributions (33%)**
   - Complete assigned quizzes, modules, essays, or reports.
   - Engage actively in the project.
   - Pursue knowledge relevant to the project.
   - Contribute to technical progress.
   - Experienced members may also contribute to project management.

3. **Teamwork and Interaction (33%)**
   - Participate in peer evaluations. Failure to submit results in a full letter grade deduction.
   - Attend meetings on time.
   - Collaborate towards team goals.
   - Coordinate and assist teammates.
   - Contribute to team presentations.

Rubric

Performance assessments will be done once at mid-terms and again at the completion of the semester. The mid-term assessment is advisory.



Notes on Documentation

Notebook Maintenance	- The notebook is preferably a bound notebook, with a sewn or glued binding, such as a composition book or lab notebook. - Your name, your project's name, your contact info, and your team members' contact info must be recorded on the outer or inside cover. - Each page must be numbered, dated, and signed.
To-Do List Maintenance	- Maintain check-boxes for items to be done. - Check-off and date items when done.
Meeting Notes	- For meeting notes, include check-boxes for items for which you are responsible and deadlines for your sub team and the overall team.
Usability	- Will your VIP notebook be of use to people who join the team later and need to refer to your notebook? This includes legibility, intelligible technical and meeting notes, and overall organization.

Overall	- An overall rating of your notebook. (Detailed design notes, design decisions, copies of or pointers to code that you wrote, records of important websites, etc.)
Wiki content	- Wiki content refers to documentation produced online, either through the VIP wiki site, T-square, Canvas or other VIP-approved site.
GT GitHub (if student is developing software)	- GitHub code refers to code produced and checked into the GT GitHub or other VIP-approved code repository. The frequency, quantity and quality of contributions are evaluated.

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

Materials/Resources

All research projects involve published papers to understand the state-of-the-art. For students lacking particular subject material, books and/or readings may be assigned. Prior VIP team reports may also be required as well as prior code written in earlier semesters. Finally, all teams produce slides which are critical to communicate research in an informal but efficient manner using pictures, diagrams and description actions in bullet lists.

Course Website and Other Classroom Management Tools

Most subteams use Box and GitHub, and most slides are developed using powerpoint. In addition, group-specific messaging software may be utilized, e.g., slack.

Peer evaluations are administered by the VIP Program. Click Here to access peer-evaluations from off campus. Click here to access from on campus. You will be prompted to sign in. Users can only log in from on campus or via VPN. Students can only access the peer evaluation portion of the system during active evaluation periods.

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 do the following:

- 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 the following:

- 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. Students are expected to be able to handle multiple classes (multitasking), so missing meetings in order to have extra study time for another class (e.g., due to an upcoming midterm the next day) is not a valid reason. Students are still responsible for all communication in meetings even if a valid reason exists for missing and teammates were informed in advance that the meeting will be missed, and therefore students are expected to be up-to-date by the next meeting.

Use of External Resources

You are encouraged to consult external sources to support your learning and project work. However, please keep in mind the following:

- 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. Students should 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, please 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 send an e-mail (see the faculty e-mail above) as soon as possible in order to set up a time to discuss your learning needs.

Attendance and Participation

All students must attend the weekly group meetings on Wednesdays, especially new students (first semester in VIP Secure Hardware); returning students (second or subsequent semester) may have a class conflict, but all such conflicts must be communicated to the professor. Each (sub-)project will determine working times designated as "sub-team meetings." Students are responsible for participating in their sub-team meetings. If you miss any meeting, you are responsible for knowing what occurred in that meeting, typically by discussing it with other team members. An excused absence does not relieve you of this responsibility.

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

This course is project based and as such does not have any exams. Furthermore, there really are no strict deadlines, but proper documentation of all work done is mandatory. Students who fall behind will be

warned by the professor that they appear to be missing a substantial amount of work; typically such a situation will be over the course of several weeks or more.

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. Georgia Tech's 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 the following:

- 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).

Course Schedule

Week	Date	Activity/Event
Week 1	January 13	Introductions Overview of team's work Discussion of semester goals …
Week 2	January 20	Sub-team selections finalized Sub-team meeting times finalized
Week 2-3	January 26	Verification of Student Participation in Class Due by Tuesday at 5pm
Week 4	February 3	Assignment: Self-grade with rubric
Week 6 or 7	Late February or early March	Midterm grades for 2000-level courses due in OSCAR (S for satisfactory, U for unsatisfactory).
Week 7 or 8	Late February or early March	Web-based peer-evaluations released for students to complete. Online form due by end of the day Friday. Late submissions will not be accepted.

Week 7 or 8	Late February or early March	Submit individual VIP documentation for mid-term grading. You'll want to have the notebooks in hand when you review peer evaluations (close at the end of week 7) and do midterm grading/ feedback. The timing of notebook collection depends on when you plan to grade and what day of the week your team meets.
Weeks 2-14	Wednesdays	Subgroup presentations
	March 17	Withdrawal Deadline
Week preceding finals	April 19 - 27 Open Close	Web-based peer-evaluations released for students to complete. Online form closes at 11:59PM on Tuesday. Late submissions will not be accepted.
Last week + two days of class	April 19 – 27	Final presentations Turn in individual VIP documentation for final grading.
Finals Week	April 29 – May 6	No final. No assignments. Only the final report is due.