Privacy Preserving Technologies

Bulletin Description

(Comp 790 Description) Permission of the instructor. This course has variable content and may be taken multiple times for credit.

General Course Info

<table>
<thead>
<tr>
<th>Term</th>
<th>Spring 2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department</td>
<td>COMP</td>
</tr>
<tr>
<td>Course Number</td>
<td>590/790</td>
</tr>
<tr>
<td>Section Number</td>
<td>171</td>
</tr>
<tr>
<td>Time</td>
<td>MW, 2:05 – 3:20pm</td>
</tr>
<tr>
<td>Location</td>
<td>SN0011</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.cs.unc.edu/~saba/priv_class">http://www.cs.unc.edu/~saba/priv_class</a></td>
</tr>
</tbody>
</table>

Instructor Info

<table>
<thead>
<tr>
<th>Name</th>
<th>Saba Eskandarian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>Brooks 346</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:saba@cs.unc.edu">saba@cs.unc.edu</a></td>
</tr>
<tr>
<td>Web</td>
<td><a href="http://www.cs.unc.edu/~saba">http://www.cs.unc.edu/~saba</a></td>
</tr>
<tr>
<td>Office Hours</td>
<td>See course website</td>
</tr>
</tbody>
</table>

Textbooks and Resources

We will primarily use Canvas for course announcements and answering questions. If you have any questions, comments, or suggestions regarding the course organization and policies, please feel free to reach out via email. An anonymous feedback form is linked on the course website if you would like to give feedback anonymously.

Assignments and grading will be handled via Gradescope through the Canvas integration.

There is no textbook for this class.

Course Description

This class covers a combination of fundamental tools and recent developments in privacy-preserving technologies. The first half of the course will cover cryptographic tools that can be used to build privacy-preserving systems, and the second half will cover various privacy-preserving technologies, including both research contributions and deployed systems. Along the way we will discuss how to think about the technology we create and its impact on society.
Class meetings will consist of a mix of lectures and discussions, with responses to pre-discussion readings being an important component. Students will also complete a semester-long project on a relevant topic of their choosing.

**Target Audience**

This class is intended for undergraduate students who are interested in thinking about what technology can do to protect privacy and why modern technology so often fails to do so. Prior experience in security or privacy, while welcome, is by no means required.

**Prerequisites**

Prerequisites for this course are COMP 283, COMP 210, COMP 211, and COMP 301 (or their equivalents).

**Goals and Key Learning Objectives**

By the end of this course, students should:

- Be prepared to think about and develop technologies that make useful improvements to users’ privacy
- Be familiar with a range of topics in applied cryptography
- Be able to read and understand the high level ideas of technical academic papers that deal with privacy

**Course Requirements**

Class meetings will consist of a mix of lectures and discussions. There will additionally be a semester-long course project. Requirements for each appear below.

**Lectures:** Participation in the form of attendance, asking questions, and completing in-class assignments is expected.

**Discussions:** Many class meetings will consist primarily of discussing assigned readings. Everyone is expected to do the reading, submit a response on Gradescope before class, and participate in the discussion.

*Do not underestimate the amount of time required to properly read and process a research paper. It can take several hours.*

**Project:** The project will last all semester and will be on a privacy or cryptography-related topic of students’ choice. The project will be completed in groups of up to 4 people and can consist of, e.g., reproducing or extending research results, implementations of new cryptographic or privacy-preserving systems, original
research, etc. Each group is required to meet with the instructor prior to submitting their project proposal. Some potential project ideas will be provided to students who want one. Students already involved in research outside of the class can use their research as the class project if their research is connected to privacy, cryptography, or security.

Project tasks will consist of an initial meeting, a project proposal, two intermediate reports, a presentation, and a final report. The final report will be a 5-10 page workshop-style paper properly typeset in Latex, and the presentation will be a 10-15 min description and summary of your project for the class near the end of the semester.

Key Dates

- Project proposal due: Feb 15
- Project update 1 due: March 8
- Project update 2 due: April 5
- Project Presentations: April 24, 26
- Final project report due: Final exam date

Grading Criteria

- Readings & responses: 35%
- In-class work: 20%
- Project: 45%
  - Pre-proposal meeting completion: 5%
  - Proposal: 5%
  - Midproject report 1: 10%
  - Midproject report 2: 10%
  - Final presentation: 10%
  - Final report: 5%

Course Policies

Reading responses are due at 11:59pm the night before the lecture for which the readings are assigned. You may skip 2 days of readings with no penalty. No late responses will be accepted.

All project-related assignments are due at 11:59pm on the listed day and must be submitted via Gradescope.

You get three “late days” in total for project deliverables during the semester. You may use a late day to submit a deliverable after the deadline via
Gradescope. Late days cannot be used for the proposal meeting, final presentation, or final paper. You may only use late days in one-day increments (no partial late days). If you submit an assignment late after running out of late days, you will receive no credit for the submission. Please submit your assignments on time and save your late days for extraordinary situations. Please contact me in advance if there are extenuating circumstances that may warrant an exception to this policy.

**Honor Code**

You must write your own reading responses, but you are welcome (and encouraged) to discuss the readings with others or consult other online sources.

Project work must be your own, but you may use research projects you are already conducting as the class project if your research is connected to security, privacy, or cryptography.

I expect all students to follow the guidelines of the UNC honor code. In particular, students are expected to refrain from “lying, cheating, or stealing” in the academic context. You can read more about the honor code at [honor.unc.edu](http://honor.unc.edu). Please see me if you are unsure about what may or may not violate the honor code in this class.

**Course Schedule**

See course website for schedule of topics

**Attendance and Participation**

Class will be held in person. Participation in class discussions and assignments are an important part of the course. That said, students who are not feeling well should not come to class and will not be penalized. Please get in touch if you need to miss many class meetings.

For some of the readings/videos included in the class, we acknowledge that sensitive subjects are being discussed that could evoke a negative emotional response from class participants based on their identities or lived experiences. You are only encouraged to participate in these aspects of the class if you are comfortable with the specified topics. You may also reach out if you have questions about course materials or if you would like more information about on-campus resources related to a specific topic.
Grade Appeal Process

If you feel you have been awarded an incorrect grade, please discuss with me. If we cannot resolve the issue, you may talk to our departmental director of undergraduate studies or appeal the grade through a formal university process based on arithmetic/clerical error, arbitrariness, discrimination, harassment, or personal malice. To learn more, go to the Academic Advising Program website.

Accessibility Resources and Services

The University of North Carolina at Chapel Hill facilitates the implementation of reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability or pregnancy complications resulting in barriers to fully accessing University courses, programs and activities.

Accommodations are determined through the Office of Accessibility Resources and Service (ARS) for individuals with documented qualifying disabilities in accordance with applicable state and federal laws. See the ARS Website for contact information: https://ars.unc.edu or email ars@unc.edu.

Counseling and Psychological Services

CAPS is strongly committed to addressing the mental health needs of a diverse student body through timely access to consultation and connection to clinically appropriate services, whether for short or long-term needs. Go to their website: https://caps.unc.edu/ or visit their facilities on the third floor of the Campus Health Services building for a walk-in evaluation to learn more.

Title IX Resources

Any student who is impacted by discrimination, harassment, interpersonal (relationship) violence, sexual violence, sexual exploitation, or stalking is encouraged to seek resources on campus or in the community. Reports can be made online to the EOC at https://eoc.unc.edu/report-an-incident/.

Please contact the University’s Title IX Coordinator (Elizabeth Hall, interim – titleixcoordinator@unc.edu), Report and Response Coordinators in the Equal Opportunity and Compliance Office (reportandresponse@unc.edu), Counseling and Psychological Services (confidential), or the Gender Violence Services Coordinators (gvsc@unc.edu; confidential) to discuss your specific needs. Additional resources are available at safe.unc.edu.
Policy on Non-Discrimination

The University is committed to providing an inclusive and welcoming environment for all members of our community and to ensuring that educational and employment decisions are based on individuals’ abilities and qualifications. Consistent with this principle and applicable laws, the University’s Policy Statement on Non-Discrimination offers access to its educational programs and activities as well as employment terms and conditions without respect to race, color, gender, national origin, age, religion, creed, genetic information, disability, veteran’s status, sexual orientation, gender identity or gender expression. Such a policy ensures that only relevant factors are considered and that equitable and consistent standards of conduct and performance are applied.

If you are experiencing harassment or discrimination, you can seek assistance and file a report through the Report and Response Coordinators (see contact info at safe.unc.edu) or the Equal Opportunity and Compliance Office, or online to the EOC at https://eoc.unc.edu/report-an-incident/.

Diversity Statement

I value the perspectives of individuals from all backgrounds reflecting the diversity of our students. I strive to make this classroom an inclusive space for all students. Please let me know if there is anything I can do to improve, I appreciate suggestions.

Syllabus Changes

I reserve the right to make changes to the syllabus, including project due dates. These changes will be announced as early as possible.