COMPUTER SCIENCE | INDEPENDENT WORK
PRINCETON UNIVERSITY

A.B. Majors
Independent Work & Thesis Handbook
Computer Science Department
Princeton University

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Preface

This handbook describes the independent work (IW) and thesis requirements for A.B. majors in the Department of Computer Science (COS).

Undergraduate independent work and theses are an integral feature of the Princeton academic experience. Independent work provides students the opportunity to work closely with a Princeton faculty member on an in-depth project they feel passionate about. Students will develop valuable transferable skills as well as something interesting to talk about in grad school applications or job interviews.

Because of the broad range of topics within computer science and the diverse interests of undergraduates, students may major in computer science through either the A.B. or B.S.E. degree program. Computer Science is the only department in the university with this flexibility. **This handbook is for A.B. COS majors doing independent work.** For the B.S.E. handbook, please visit https://www.cs.princeton.edu/ugrad/independent-work or email mhornstein (@princeton.edu).

Portrait of the Discipline

In a computer science program, students can anticipate gaining a comprehensive understanding of foundational principles and advanced concepts in computing. They will delve into programming languages, algorithms, data structures, software development methodologies, and various specialized areas such as artificial intelligence, databases, and networking. A noteworthy aspect of such a program lies in the value of independent work projects. Through these projects, students cultivate problem-solving skills, creative thinking, and the ability to apply theoretical knowledge to practical situations. These projects empower students to design, implement, and refine their own software solutions, fostering a deeper grasp of real-world challenges and technological innovation. This hands-on experience not only hones technical expertise but also nurtures teamwork, project management, and the perseverance necessary for success in the dynamic landscape of computer science.

Learning Goals for COS Independent Work

- Students will be able to read and comprehend technical literature in computer science;
- Students will be able to plan and complete a one- or two-term project in an area of computer science of their choice;
- Students will be able to identify, isolate and solve important technical subproblems that lead to a solution to a more significant problem;
- Students will be able to present technical ideas in computer science clearly, both orally and in written form;
- Students will be able to identify and assess related work in their area of study;
- Students will demonstrate an ability to work independently in accomplishing all of the above goals.

Introduction to IW and Thesis Management Tools

In order to assist students and advisers in managing independent work and thesis projects, the department uses the following tools that will be referenced in this handbook:

IW Portal

All COS A.B. seniors and A.B. juniors in the spring term must sign up in the IW Portal. The IW Portal is where all assignments are submitted.

https://iw.cs.princeton.edu/portal

Canvas/ Ed Discussion

All general communication about IW and thesis will be posted to Ed Discussion through Canvas. IW seminar instructors and JRW instructors may also use Canvas for communication and to collect weekly progress reports or other homework-type assignments.

Students are encouraged to use Ed Discussion on the General IW Canvas site to ask questions that may be applicable to others.

The IW Administrator will post reminders about upcoming assignments and information sessions through Ed Discussion.

https://canvas.princeton.edu/

COS A.B. Independent Work Requirements

COS A.B. majors are required to participate in a Junior Research Workshop (JRW) in the fall of junior year, a separate term of independent work (IW) in the spring of junior year, and a two-term thesis in senior year.

A.B. Junior, Fall Term

Junior Research Workshops (JRWs)

All COS A.B. juniors in the fall term will be required to complete the independent work requirement by enrolling in a Junior Research Workshop (JRW) and associated methods course.

Click here for more information about the Junior Research Workshops (JRWs)

A.B. Junior, Spring Term

In the spring, COS A.B. juniors may either complete the project proposed at the end of the fall JRW or embark on a separate research endeavor through one of the following advising structures:

IW Seminar

The independent work seminars allow a small group of students and a faculty adviser with shared interests to meet and work on related projects.

IW seminars are recommended for students who would like to have a bit more structure built into an independent work project. In the IW seminars, students meet weekly with their instructor/adviser and get regular feedback from peers.

Click here for more information about IW seminars.

One-on-One Independent Work Projects

Students doing one-on-one IW projects work on their own and schedule meetings with an adviser independently.

We find that students are most successful in one-on-one IW projects when they are self-motivated, proactive, organized, responsible, resourceful, passionate about the project, and able to work independently.

Click here for more information about one-on-one IW projects.

Click here for information on selecting an adviser.

A.B. Senior, Two-Term Thesis

All COS A.B. seniors are required to complete a two-term senior thesis project on a topic of their choosing.

As with the single-term one-on-one projects, senior thesis students work on their own and schedule meetings with an adviser independently.

Click here for more information about senior thesis projects.

Click here for information on selecting an adviser.

Grading

All independent work and theses must be taken for a grade.

Grades are recommended by advisers/seminar instructors, and confirmed by the IW Coordinators.

A+: Exceptional. Significantly exceeds the highest expectations for undergraduate work. The work should reflect an exceedingly high degree of originality, independence, and understanding by the student. Project results are unimpeachable and of the highest impact. Oral presentation and paper are impeccably prepared, and their delivery is of the highest quality. Projects earning this grade typically have gained some outside recognition and/or impact through presenting at a conference, having an accepted publication, releasing widely adopted software, getting a startup funded, etc.

A : Outstanding. Meets the highest standards for the assignment. The work reflects originality, independence, and a comprehensive understanding of the topic. Project results are clear and impactful. The oral project presentation exhibits a high level of preparation and delivery, and the project paper is error-free in concept and is very carefully prepared.

A-: Excellent. Meets very high standards for the assignment. There is originality in the approach, and a clear contribution was made based on independent work effort by the student. Understanding of the topic was appropriate, and the oral presentation and written paper were understandable, clear, and mostly error-free.

B+: Very Good. Meets high standards for the assignment. The student was able to formulate a reasonable approach and achieved good results. A little guidance from the advisor was needed to keep the student's project on track. The student showed an understanding of the topic, but the project could have benefitted from more work on the project's implementation and/or evaluation components. The oral presentation and paper were of high quality, but some editing would have improved them.

B: Good. Meets most of the standards for the assignment.The work lacks some originality but is well executed with some interesting results. Substantive interactions with the advisor were necessary to define, refine, and carry out the project . Understanding of the topic improved over time, but more work would have improved the results. The oral presentation and project paper were mostly accurate, but both could have been improved with more attention to detail.

B-: More Than Adequate. The student shows a reasonable command of the material. Substantial and repeated direction from the advisor and others was necessary. Work is lacking in originality, and some content was missing or incomplete. Results were achieved, but there may have been some gaps in execution or data analysis. The oral presentation and project paper were of fair quality.

C+: Acceptable. Meets basic standards for the assignment. The student has command of some of the material. Independence of thought and action was lacking. The advisor was driving the project rather than the student. Understandable content was there, but it showed significant gaps. Results showed signs of incompleteness and a lack of data analysis skills. Oral Presentation and paper were completed.

C: Somewhat Acceptable. Meets some of the basic standards for the assignment. The student did some work, but it was clearly lacking in originality, innovation, and independence. Oral presentation and paper were finished, but the results were minimal and prosaic.

C-: Acceptable but Lacking Key Qualities. Did not meet several important standards. Nothing interesting was attempted. The student showed only a rudimentary understanding of the scope of the work. Oral presentation and/or paper were incomplete in some significant ways.

D: Minimally Acceptable. The student tried to do something. Oral presentation and paper were submitted. Lowest passing grade.

F: Not acceptable. Work not submitted, or if work was submitted, it failed to meet minimal standards for content.

Grading Penalties

All final papers submitted after the deadline will incur a 1/3 grade penalty.

Types of Independent Work

Junior Research Workshops (JRWs)

JRWs are open only to COS A.B. juniors in the fall.

All COS A.B. juniors in the fall term are required to complete the independent work requirement by enrolling in a Junior Research Workshop (JRW) and associated methods course.

Every year the department will designate 2-3 courses in the fall term as methods courses.

Each methods course will have an associated Junior Research Workshop (JRW), and students must enroll in the methods course as well as the JRW, or they must have previously taken and passed the methods course. Participating in the JRW and doing all required work counts as Independent Work for the fall, and this is how A.B. juniors will fulfill the IW requirement (COS 981).

JRWs will teach students — in the context of technical knowledge imparted by the methods course— how to come up with and evaluate research ideas and then formalize the idea in the form of a proposal and a concrete work plan. JRWs will hold meetings separately from the methods course and teach research methodologies relevant to independent work, including discussion of related literature, appropriate software environments, and writing/research techniques. Discussion will assume knowledge of concepts taught in the associated methods course. **Hence all students in a JRW need to be enrolled concurrently in the associated methods course or have taken it in a prior term.**

The final product for the JRW (due on the JIW deadline in January) will be a well-researched and polished 8-10-page proposal for an IW project. A student's IW grade for the fall (COS 981) will be assigned by the JRW instructor(s) based on the student's participation in JRW activities and the written proposal.

In the spring, A.B. juniors may select an IW seminar or one-on-one IW project. A.B. juniors may build on their JRW project **provided they find a seminar or one-on-one adviser to support it**. Many A.B. juniors also chose to pursue a new project.

Independent Work Seminars

IW seminars are open to COS A.B. majors in the spring of junior year.

The IW seminars provide a way for students working on similar projects to have more interaction, assistance, and feedback from peer students. Each student chooses and works on their own project, just as in any other IW. The only difference is that meetings occur with faculty and other students, seminar-style, once per week at a scheduled time. During the meetings, students discuss what they are doing, provide feedback to other students, and generate ideas for future work. The seminars provide a forum for honing small-group presentation and discussion skills that will be essential after graduation. Individual meetings with the faculty adviser are also possible by arrangement.

Within these seminars, it is possible for groups of 2-3 students to work on different parts of the same large-scale project. As an example, a few students might work together on a system for collaborative grading of assignments in MOOCs (massive open online courses), with one student developing the user interface, another designing the algorithms for assigning problems to graders, and a third implementing a system for integrating grader responses in the back-end server. **Every student is responsible for writing a paper and making presentations individually**, but it might be possible to achieve much more with a collaborative effort than with a set of individual ones (the whole is greater than the sum of the parts). In any case, team efforts could be more fun and engaging for the participating students. Please see the Collaboration Policy section below for more information about group IW projects.

The titles, faculty advisers, expected meeting times, and abstracts for the IW seminars are released each term at the COS Advising Fair and are updated on the IW seminar webpage.

Who Should Sign-Up for the IW Seminars?

All students who plan to do independent work for the first time should consider signing up for an IW seminar. Though the seminars target first-time IW students, they are open to any COS junior or senior who is not working on a senior thesis or JRW. The content of the IW seminars includes not only independent work on a project but also guidance about how to choose projects, evaluate progress, design experiments, collaborate with others, make presentations, and other project management skills. These skills are essential for becoming an effective researcher and provide great training for working in a company or startup. Thus, the seminars are perfectly suited for students doing their first term of independent work.

One-on-One IW Projects

One-on-one IW projects are open to COS A.B. majors in the spring of junior year.

Students who have already done a previous term of independent work, or who want to work on a project outside the scope of the topics offered in the IW seminars, can make arrangements with a Princeton faculty member for one-on-one IW advising.

Students doing one-on-one IW projects work on their own and schedule meetings with their advisers independently.

Who Should Sign-Up for a One-on-One IW?

Students are most successful in one-on-one IW projects when they are self-motivated, proactive, organized, responsible, resourceful, passionate about the project, and able to work independently.

Senior Thesis Projects

All A.B. seniors are required to complete a two-term senior thesis project on a topic of their choosing.

The senior thesis is intrinsic to a Princeton education and provides students the opportunity to work independently and in-depth on a topic of interest. All thesis projects must have a strong computer science component, but beyond that are wide open. Students will use the skills they have developed over the first three years at Princeton and apply them to application development, entrepreneurial adventures, educational projects, community service, academic research, data analysis, interdisciplinary studies, analysis of public policy, or other pursuits that are challenging and enriching.

As with one-term one-on-one projects, students are responsible for scheduling regular meetings with their advisers independently.

Enrolling in Independent Work

COS A.B. majors **do not** need to enroll in independent work on TigerHub. The Registrar's office will place the independent work course codes on student transcripts after the term has begun. Junior independent work appears as COS 981 in the fall and spring terms of junior year. The senior thesis will appear in the spring term of senior year as COS 983 and COS 984.

Below is more information about the other enrollment steps A.B. students must follow each term.

Enrolling in Junior Research Workshops (JRWs)

COS A.B. majors are required to enroll in a methods course and associated JRW for the fall of junior year. The methods courses will be announced on the JRW webpage before add/drop in the spring term of sophomore year, around the A.B. declaration period.

Fall 2024 Methods Courses and Instructors

- COS 324 - Jia Deng and Adji Dieng
  - Workshops will be held on **Mondays, 11:00 am - 12:20 pm** (4-6 Workshops)
- COS 316 - Wyatt Lloyd and Robert Fish
  - Workshops will be held on **Wednesdays, 11:00 am - 12:20 pm** (4-6 Workshops)

How to enroll in JRWs

1. Enroll in one of the above methods courses through TigerHub
   a. Note: students who have previously taken and passed one of the above methods courses can skip this step if they are planning to enroll in the associated JRW.
2. Fill out the JRW Enrollment Form for your associated JRW
   a. JRWs have no capacity limit, and a **student can freely switch into another JRW until the end of the fall add/drop period in September,** provided that the student is also enrolled in the relevant methods course or has previously taken it.
3. Do not enroll in another course that takes place during the time slot of your JRW.

For questions about JRW enrollment, please look through our FAQs first, then email additional questions to the JRW Administrator, cosjrw (@princeton.edu).

Enrolling in an IW Seminar

In the spring term, COS A.B. and B.S.E. majors both have access to enroll in the IW seminars. All students will complete their seminar preferences in the IW Sign-Up Form in the COS IW portal. This form usually opens on or around the date of the Advising Fair each term. Students will then be assigned to a seminar by the IW Coordinators and IW Administrator. While the department cannot guarantee every student a spot in their top choice seminar, student interests and schedules are accommodated as best as possible. COS A.B. majors get top priority in seminar assignments since IW is *required* in the spring.

After being assigned to an IW seminar, students may switch seminars if open seats are available. Email the IW Administrator, Mikki Hornstein, mhornstein (@princeton.edu) for more information.

Note: Students may also switch to a one-on-one project from a seminar before the end of the add/drop period.

How to enroll in an IW seminar:

1. Sign in to the IW Portal with your netID and password.
2. Click the “Click to complete form” button under the “IW Sign-Up Form” area of the spring term.
3. Select “I will be in an independent work seminar this spring (best choice if little previous IW experience)” within the “Options” box.
4. Rank the IW seminars in order of preference (1st choice, 2nd choice, 3rd choice, etc.)
5. Answer the following prompt: “Please describe your interests and goals related to independent work this fall. Include any relevant coursework and/or work experience.”
6. Include any scheduling conflicts that the IW Administrator should know about.
    a. Note: As indicated above, students are not guaranteed a spot in any particular seminar, but schedule and preferences are accommodated as best as possible.
7. Click the blue submit button at the bottom of the page.

The IW Administrator will contact students with their IW seminar placements a few weeks before the start of the spring term.

Enrolling in a One-on-One IW Project

Once a student has identified their adviser and a project topic, the student will log in to the COS IW portal and complete the IW Sign-Up Form for the spring term. This form usually opens on or around the date of the Advising Fair each term.

How to enroll in a one-on-one IW project:

1. Sign in to the IW Portal with your netID and password.
2. Click the "Click to complete form" button under the "IW Sign-Up Form" area of the spring term.
3. Select "I will be doing one-on-one research with a professor this spring (COS398 & COS498 & **Junior AB**)" within the "Options" box.
4. Select adviser name from the drop-down list, or
    a. If your adviser is not listed, check the box that says, "My adviser is not listed above." Enter your adviser's name, then email the IW Administrator, Mikki Hornstein, mhornstein (@princeton.edu), to let Mikki know that your adviser needs to be added to the drop-down list.
    b. Add the name(s) of any additional advisers.
5. Enter the proposed project title.
    a. Note: If you don't have a title yet, that's fine. You can enter "TBD" temporarily and edit it later. It's most important that we know you are paired with an adviser.
6. Enter a brief project description.
    a. Note: As with the project title, if you don't have a description yet, that's fine. You can enter "TBD" temporarily and edit it later. It's most important that we know you are paired with an adviser.
7. Click the checkbox indicating that you confirm that your adviser has agreed to advise you on this project.
8. Click the blue submit button at the bottom of the page.

Enrolling in a Senior Thesis

Enrolling in a senior thesis is very similar to enrolling in a one-term one-on-one IW project.

Once a student has identified their adviser and a project topic, the student will log in to the COS IW Portal and complete the IW Sign-Up Form for the fall term. This form usually opens on or around the date of the Advising Fair in the spring.

How to enroll in a senior thesis:

1. Sign in to the IW Portal with your netID and password.
2. Click the "Click to complete form" button under the "IW Sign-Up Form" area of the fall term.
3. Select "I will be doing a senior thesis this year (COS398 & COS498 / **Senior AB**)" within the "Options" box.
4. Select your adviser from the drop-down list, or
    a. If your adviser is not listed, check the box that says, "My adviser is not listed above." Enter your adviser's name, then email the IW Administrator, Mikki Hornstein, mhornstein (@princeton.edu), to let Mikki know that your adviser needs to be added to the drop-down list.
    b. Add the name(s) of any additional advisers
5. Enter the proposed title of your project
    a. Note: If you don't have a title yet, that's fine. You can enter "TBD" temporarily and edit it later. It's most important that we know you are paired with an adviser.
6. Enter a brief description of your planned project
    a. Note: As with the project title, if you don't have a description yet, that's fine. You can enter "TBD" temporarily and edit it later. It's most important that we know you are paired with an adviser.
7. Click the checkbox indicating that you confirm that your adviser has agreed to advise you on this project.
8. Click the blue submit button at the bottom of the page.

2024-25 Independent Work and Thesis Deadlines

These deadlines will also be available on the Important Steps & Deadlines webpage. More information about the assignments listed below can be found in the Assignment Descriptions section of this handbook.

Fall 2024 JRWs (COS A.B. Juniors only)

Your JRW adviser(s) will provide information on your assignments and deadlines at the beginning of the term.

The final written JRW proposal is due: January 11, 2024 by 11:59pm

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Spring 2025 IW Projects (COS A.B. Juniors only)

Date	Event/Deadline	Location	Notes
January 28, 2025 12:30pm	IW Getting Started Meeting	Room TBD	Attendance required
February 14, 2025 5:00pm	SEAS Spring Funding Application due	bseprogram (@princeton.edu)	
February 20, 2025 11:59pm	Written Project Proposal due	IW Portal	
March 6, 2025 11:59pm	Checkpoint Form due	IW Portal	
March 25, 2025 12:30pm	How to Give an IW Talk, information session	Room TBD	Attendance required
April 8, 2025 12:30pm	How to Write an IW Paper, information session	Room TBD	Attendance required
April 15, 2025 11:59pm	Oral presentation slides and video due	IW Portal	
April 27, 2025 11:59pm	Written Final Paper due	IW Portal	⅓ grade penalty assigned for papers submitted after this deadline.

Thesis Projects, 2024-25 (A.B. Seniors only)

Date	Event/Deadline	Location	Notes
September 3, 2024 12:30pm	IW Getting Started Meeting	Room TBD	
September 27, 2024 5:00pm	SEAS Fall Funding Application due	bseprogram (@princeton.edu)	
September 26, 2024 11:59pm	Written Project Proposal due	IW Portal	
October 22, 2024 11:59pm	Checkpoint Form due	IW Portal	
December 8, 2024 11:59pm	Progress Report Form due	IW Portal	
February 14, 2025 5:00pm	SEAS Spring Funding Application due	bseprogram (@princeton.edu)	
February 20, 2025 11:59pm	Draft Paper due	IW Portal	
February 27, 2025 11:59pm	Second Reader for Senior Thesis due	IW Portal	
March 25, 2025 12:30pm	How to Give an IW Talk, information session	Room TBD	
April 8, 2025 12:30pm	How to Write an IW Paper, information session	Room TBD	
April 10, 2025 11:59pm	Written Final Thesis Paper due	IW Portal	⅓ grade penalty assigned for papers submitted after this deadline.
April 22, 2025 11:59pm	Oral Presentation Slides due	IW Portal	
April 21-25, 2025	Thesis Oral Presentations Week	Live, Schedule with adviser	

Assignment Descriptions

Below are specific details about the various IW and thesis assignments. Please note that **not all assignments listed below are applicable to every student every term**.

Please check the applicable deadlines section above to determine which specific assignments apply to you.

Written Project Proposal (Spring Term and Thesis Projects only)

Three or four weeks into the term, students must submit a 1-2 page written proposal describing their intended project plan. The written proposal should have the following sections:

- **Title**. Include name, class, project title, and adviser.
- **Motivation and Goal**. Give a high-level introduction to the topic area and state precisely what problem you will address. Students should clearly state the goal of the project with a sentence beginning "The goal of my project is …". Explain why that goal is essential and/or interesting, perhaps with a description of applications or people enabled by achieving it.
- **Problem Background and Related Work**. Place the project in the context of prior work. Give some background of what has been done before to achieve the stated goal. Include citations to closely related academic papers and/or list commercial products targeted at the same goal. Finish this section with a brief explanation of the problem unsolved by previous work that their project will address.
- **Approach.** Provide a concise description of the key idea underlying the approach to achieving the stated goal. Provide an argument of why this approach is a good idea – i.e., why it can reach the stated goal where others have not.
- **Plan.** Students should describe the steps they plan to take and/or the issues they plan to address during the execution of the project. What data sets must be acquired? What algorithms must be developed? What theorems must be proven? etc. For the non-trivial steps, briefly describe the issue, options, and planned approach. Please indicate any particularly risky aspects of the project and discuss contingencies if they do not go as planned.
- **Evaluation**. Describe the methodology that will be used to evaluate how well the project achieved the stated goal. Be specific. What data will be used? What test will be run? What quantitative metrics will be used to measure success? etc. This is an essential and often overlooked aspect of a project plan – please think about it before finalizing the project selection.

How to submit the Written Project Proposal

1. Sign in to the IW Portal with your netID and password.
2. Create a PDF file named "**written_project_proposal.pdf**"
3. Click the “Submit File” button next to “Written Proposal” in the “Manage your independent work” section of the IW portal.
4. Click the “Browse” button to upload the file from your computer
5. Click the blue “Submit” button at the bottom of the page
6. Email the PDF file to your adviser

Note: Students have the ability to submit a new file before the deadline, if necessary.

Mid-Term Checkpoint Form

Around midterms week, students will submit the Mid-Term Checkpoint Form. The Checkpoint Form serves as a tool to provide feedback to students and to the department about whether a student is making consistent progress, whether a student should meet with their adviser more often, and/or whether there are any potential roadblocks to a student completing their proposed project.

The Checkpoint Form is not supposed to be difficult or take much time. Students will write a brief description of what has been accomplished so far and what remains to be done. The checkpoint form is divided into three parts:

1. Progress to date: Mention any ideas you have had, software that has been built, related research evaluated, and papers or textbooks read.
2. Current difficulties: If you are having difficulty making progress on the project due to some obstacle, explain the obstacle and a plan for overcoming the problem.
3. Next steps: Detail how you anticipate proceeding for the rest of the term.

As a guideline, students should be meeting approximately weekly with advisers and updating advisers on progress and challenges. This will happen naturally in an IW seminar. One-on-one students should set up a schedule to meet their adviser. Meeting every week at the same time is highly recommended. Students are encouraged to allocate 10-15 hours of time per week for progress on their independent work projects.

How to Submit the Mid-Term Checkpoint Form

1. Sign in to the IW Portal with your netID and password.
2. Click the “Click to complete form” link in the “Checkpoint Form” section under “Manage your independent work”
3. Enter the project title
4. Enter the approximate number of meetings with your adviser
5. Enter your progress to date, current difficulties, and next steps.
6. Click the blue “Submit” button at the bottom of the page

After a student submits the Checkpoint Form, their adviser will receive an email notifying them of the submission and with a link to provide the student with a response.

Midpoint Progress Report (Thesis Projects only)

At the end of the fall term, thesis students will submit the Midpoint Progress Report. The Midpoint Progress Report is identical to the Checkpoint Form completed earlier in the fall term.

How to Submit the Midpoint Progress Report

1. Sign in to the IW Portal with your netID and password.
2. Under the “Manage your independent work” section in the IW portal, click the “Click to complete form” link in the “Midpoint Progress Report” section
3. Enter the project title
4. Enter the approximate number of meetings with your adviser
5. Enter your progress to date, current difficulties, and next steps.
6. Click the blue “Submit” button at the bottom of the page

After a student submits the Midpoint Progress Report, their adviser will receive an email notifying them of the submission and with a link to provide the student with a response.

Oral Presentation

Toward the end of the spring term, students will complete an oral presentation.

- **A.B. juniors** in the spring term will be required to submit a **recorded** oral presentation and slides to the IW Portal.
- **A.B. seniors** in the spring term will be required to complete a **live** oral presentation for their thesis adviser, as well as submit their oral presentation slides to the IW Portal.

To prepare, all students should plan to attend the "How to Give an IW Talk" information session.

Students will be assessed on both the content, and the clarity and effectiveness of the presentation.

Specific oral presentation requirements are below. For additional advice and resources, click here.

Time Limits

For one-term projects, A.B. juniors will have at most **nine (9) minutes** long for the recorded talk. Students will submit a link to the talk and a pdf of the slides to the IW Portal.

For thesis projects, A.B. seniors will have at most **twelve (12) minutes** for the talk and three minutes for questions. Thesis oral presentations will be given live during a designated "oral presentation week" at the end of the spring term.

Slides

Students can make their presentation slides in any presentation tool (e.g., Keynote or PowerPoint), as long as it can be exported to PDF. Although there are many ways to organize the presentation and slides, we strongly recommend that you adhere to the following outline:

- **Title slide**: Include name, class, project title, and adviser.
- **Motivation and Goal**: Introduce the topic area and state specifically what problem you will be addressing. You should clearly state the goal of your project (i.e., "The goal of my project is …"). Explain why that goal is important and/or interesting. What people and/or applications would benefit? Give some examples of the problem being addressed to help make it easier to understand.
- **Problem Background and Related Work**: You probably are not the first person to work towards this goal, nor will you be the last. Give some background of what has been done before. Have academics already written papers on this topic? Are there already products on the market? Why do they not solve the problem? What aspects of the problem are

still uninvestigated? It is always the case that someone has done something that can be related to what you are going to do. Find out the most closely related pieces of work and explain the relationship to your proposed project.

- **Approach:** Clearly explain the key idea behind the approach you are taking and explain why it is a good idea. What is your key insight to solve the problem? What makes this approach unique in comparison to previous work? It might be that you are asking a different question than others have before, attacking the problem in a different way, or using different tools, or leveraging different data sets. In any case, describe the most interesting "key idea" behind the project and justify why you chose it.
- **Implementation:** Describe the steps that have been completed and/or the subproblems that have been solved to make progress on your project. For each of them, you may want to describe: What was the main issue? What options were available? What solution did you create/choose and why? How did you perform the implementation? What tools were used? How well does the solution work? What remains to be done? If your implementation is not complete, outline any logistical or technical problems you anticipate and explain any contingency plan you have for avoiding or coping with them.
- **Results**. Every project should have some means of measuring success. Explain the methods you will use to evaluate how well your implementation achieves the goal articulated at the beginning of the talk. Perhaps you will need to describe the test data sets, measurement techniques, evaluation metrics, etc. If possible, provide some quantitative comparisons of the results to alternative methods (e.g., the previous state-of-the-art, random results, etc.). Part of (not the entire presentation) may involve giving a demo of your results.
- **Conclusion**. Sum up the most important aspects of the talk concisely.

Note that some of the points may not be relevant for some types of projects, and others will probably require more than one slide. Please do not feel constrained by the number of slides, and do not feel that you have to address every point raised above. **Tell a coherent story** about what you are trying to do, how you are doing it, and how well your solution works … while staying within the time limits.

How to submit oral presentation slides

1. Sign in to the IW Portal with your netID and password.
2. Create a zip file named **"oral_presentation.zip"** containing all the files needed for your talk.
3. Click the "Submit File" button next to "Oral Presentation" in the "Manage your independent work" section of the IW portal.
4. Click the "Browse" button to upload the file from your computer
5. Click the blue "Submit" button at the bottom of the page
6. Email a ZIP file with your slides to your adviser.

Video-Recorded Oral Presentation (COS A.B. Juniors only)

The video-recorded oral presentation is applicable to A.B. juniors in the spring only.

A.B. juniors will have at most nine (9) minutes long for the pre-recorded presentation. Students will submit a link to the presentation and a pdf of the slides to the IW Portal.

Details regarding how to record the IW oral presentation will be provided during the "How to Give an IW Talk" information session and on Canvas. Students are welcome to use any approach to record the oral presentation but should keep in mind that **the focus of the video is the content of the presentation**, not video production. The format of the recorded presentation also needs to be accessible to the faculty graders without having to download any special software.

For additional advice and resources, click here.

How to Submit the Video Recorded Oral Presentation

1. Upload the recorded presentation somewhere that creates a unique hyperlink to access it. In the past, students have used Google Drive, Zoom, YouTube, and the like.
    a. Make sure that the sharing settings are set such that the IW Coordinators, IW Administrator, and your adviser do not need any special permissions to view the video recording.
2. Submit the hyperlink to your recorded oral presentation to the IW Portal
    a. Sign in to the IW Portal with your netID and password.
    b. Under the “Manager your independent work” section in the IW portal, click the “Click to complete form” link in the “Oral Presentation Video Link” section.
    c. Paste the url to your recorded oral presentation into the text box
    d. Click the blue “submit” button at the bottom of the page.

In-Person Thesis Oral Presentation (COS A.B. Seniors only)

For A.B. seniors, the thesis oral presentation counts as the departmental exam required for graduation. For this reason, **all thesis oral presentations must be presented live.**

A.B. seniors will have at most twelve (12) minutes long for the live oral presentation. Students will also submit a pdf of the slides to the IW Portal.

Important Steps:

1. Schedule a presentation time directly with your thesis adviser.
2. Invite your second reader.
3. Submit a pdf of the slides to the IW Portal.
4. Email the pdf of the slides to your adviser and second reader.

For additional advice and resources, click here.

Second Reader (Thesis Projects only)

Toward the beginning of the spring term, A.B. seniors are required to submit the name of a second reader to the IW Portal. Every thesis must have both an adviser and a second reader. The second reader reviews the thesis and provides input on the final grade. Students may want to choose and involve a second reader early on in the project. **If a student's primary adviser is not a COS faculty member, then the Second Reader MUST be a COS faculty member.**

Second readers can be postdocs, but they cannot be your adviser's postdoc.

How to Submit to the IW Portal:

1. Login to the IW Portal with your netID and password.
2. Add the name of the second reader in the "Second Reader Form" under the "Manage your independent work" section in the IW Portal.
3. Click the blue submit button at the bottom of the page.

Draft Paper (Thesis Projects only)

Towards the middle of the spring term, thesis students submit a draft paper. This is not expected to be a full thesis, but it should include a complete outline with some of the motivation, background, and approach filled out. The draft paper should be at least 4-5 pages long (single-spaced).

Students should discuss the exact requirements for the paper with their adviser. While the department has a minimum requirement of 4-5 pages, an adviser may wish to see more. In general, the draft paper might contain (one or more of) the following components:

1. Background information and problem description. What is the general area of research and the specific problem that will be tackled?
2. Related research. Have there been previous academic papers on this or related topics? Are there companies that have developed related software products? What is the historical context? Be sure to cite related research properly. Include a bibliography at the end of your paper.
3. Progress so far. Explain major accomplishments so far. Be as precise as possible. What papers have you read? What are they about? Give examples, charts, diagrams, and proofs to back up your ideas wherever possible and appropriate. What new algorithms

have you defined? -- describe them in detail if they are sufficiently interesting and novel. Have you defined your overall software architecture? -- Describe it in detail and justify your design. Do you intend to prove something about your research? -- Give a proof outline. Have you proven any intermediate theorems or lemmas? State what they are and explain the proof.

4. Plan for the remainder of the year. Outline the steps you will take to complete the thesis. Explain how you will evaluate your results. Include a table with a concrete set of deadlines for finishing major components of the project. Include at least 3 weeks for writing.

How to Submit in the IW Portal:

1. Login to the IW Portal with your netID and password.
2. Create a PDF file named **"draft_paper.pdf"**
3. Submit the PDF file via the IW Portal. Use the submit link for "Draft Paper" under the “Manage your independent work” section in the IW Portal.
4. Email the PDF file to your adviser.

Written Final Paper

Toward the end of the spring term, and usually before the official university deadline(s), students must submit a final written paper describing the goal(s), related work, approach, implementation, results, and conclusion of the project, using much the same outline as suggested for the oral presentation. Unlike the oral presentation, which must be extremely concise due to time constraints, the written paper can delve into more details, cite all relevant previous work, present the results of many experiments with tables and plots, etc.

To prepare, all students should plan to attend the “How to Write an IW Paper” information session.

Final papers are graded on the basis of technical content, organization, creativity of ideas, and quality of writing. All final papers should contain a proper bibliography, and all non-original text should be properly attributed. Failing to cite appropriate sources for ideas, tables, text, or diagrams is a serious violation of Princeton's honor system. Students who are unsure about how to cite ideas or research papers properly and create a bibliography should speak with their adviser. **AI tools such as ChatGPT are completely prohibited for use when drafting/writing the final paper.**

Templates:
Though the written final paper should look like a professional document (e.g. 12pt Times-Roman font, 1-inch margins, double-spaced) there are no official formatting rules for a COS final IW or thesis paper. That said, below are some templates that students are welcome to use.

Princeton University provides free Overleaf Professional accounts for all students, faculty and staff who would like to use a collaborative, online LaTeX editor for their projects. Overleaf Professional accounts provide real-time track changes, unlimited collaborators, and full document history.

Formatting guidelines for the templates are here. Files for use in Overleaf are below.

- A.B. Juniors: Single-term IW final paper files.
- A.B. Seniors: Thesis final paper files.

Final Paper Length Recommendations:
- A.B. Juniors: final written papers for one-term projects should be 20-25 pages long.
- A.B. Seniors: final written papers for thesis projects should be 40-50 pages long.

How to Submit in the IW Portal:

- Login to the IW Portal with your netID and password.
- Create a PDF file named ***"written_final_report.pdf"***
- Click the "Submit File" button next to "Written Final Report"in the "Manage your independent work" section of the IW Portal.
- Click the "Browse" button to upload the file from your computer.
- Click the blue "Submit" button at the bottom of the page.
- Email the PDF file to your adviser.

For additional advice and resources, click here.

Note: COS thesis papers are not required to be printed/bound and as such, the department does not provide funding for thesis binding.

Mudd Library Thesis Archive (Thesis Projects only)

All students must archive a copy of their final thesis papers with the university library.

Step-by-step instructions and more details about submission requirements are here.

Information Sessions

COS A.B. Welcome Meeting for Rising A.B. Juniors

Offered in the spring of sophomore year, usually toward the end of or right after A.B. declaration period. The A.B. Welcome Meeting is a chance for us to welcome newly declared A.B. students to the COS department and to provide information about what to expect for independent work over the next two years. Students receive information about how to sign up for JRW in the fall.

Getting Started Meeting

During the first few days of the term, we host a "Getting Started" meeting for IW and thesis students to explain the key requirements, review the schedule for the term, and provide information about the seminars. Attendance is mandatory for all students starting IW that term.

- Click here for the Spring 2024 IW Getting Started Meeting Slides

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“How to” Meetings

During the second half of each term, we have meetings to provide students with information and guidelines about how to give an IW talk and how to write an IW paper. These sessions will provide critical information about what content to include and what formatting to use for your work. They are mandatory for all students doing IW for the first time.

- Click here for the Spring 2024 "How to Give an IW Talk" Slides
- Click here for the Spring 2024 "How to Write an IW Paper" Slides

IW and Thesis Funding

SEAS IW & Thesis Funding

Students may apply for support for senior thesis and independent work research from funds administered by the SEAS Dean's Office. All awards are contingent on the availability of funds.

These funds are normally restricted to consumable supplies, software, small equipment, and parts and travel for field experiments. They specifically **do not cover** books and journals, food and refreshments, copying, thesis preparation, and poster printing costs, or capital equipment.

There are two funding rounds annually. Applications for fall are typically due mid-to-late September. Applications for spring are typically due mid-February. Students will receive an email from both SEAS and the COS IW administrator about the release of the funding application, deadlines, and requirements. Application deadlines are firm. Late applications are not accepted.

Application Guidance

- Fill out the .pdf application form and save it with a file name that includes your full name
- Check that the file saved all of the filled form info
- Include all necessary supporting documents with your application, and combine them into one .pdf document before submitting
- Send the application to your adviser for review and signature.
    - Note: **DO NOT SEND THIS TO YOUR ADVISER AT THE LAST MINUTE.** The advisers are busy people with full teaching, advising, and research responsibilities, as well as families and outside responsibilities.
- Provide a full and realistic itemized budget. Do your best with the cost estimates.
    - Though SEAS is regularly quite generous with the funding they award, it is extremely important that you justify the funding request with a well-thought-out budget detailing how you intend to spend the award money.
- Cloud computing services have a maximum of $300 funding. Other requests have a general maximum of $500.
    - SEAS will fund above this amount if there is convincing evidence as to why it is needed. So if you need over $500, it's worth including it in the application.
- This is not a competitive application. The university wants to fund what you need for the research, so be thoughtful in your approach to the funds required.

How to Access SEAS Funding

Access to funding is contingent upon IRB approval, if applicable. SEAS will let students know if they are required to go through the IRB approval process.

There are two main ways to use SEAS funding:

1. Order what you need, and send the receipt to the IW Administrator, Mikki Hornstein, mhornstein (@princeton.edu). The IW Administrator will send you a reimbursement through SAFE. This is the preferred method.
2. If you are unable to order equipment for yourself (for example, you do not have access to a credit card) and would like someone to place an order for you, send an email to the IW Administrator, Mikki Hornstein, mhornstein (@princeton.edu) with a link to what you need to be purchased; include the quantity needed. The IW Administrator will use the departmental credit card to place the order and have it delivered to the COS building. You will receive an email with information about how and when to pick up the items when they are available.

Please note that all equipment purchased with SEAS funding must be returned to the department at the end of your IW project for use by future students. Please keep the original packaging for easy return and storage.

SAFE Funding Opportunities

A.B. senior thesis funding opportunities, including those from individual academic departments, the Office of the Dean of the College, and other offices and programs on campus, are posted through the Student Activities Funding Engine (SAFE). The Office of Undergraduate Research (OUR) administers the Dean of the College thesis funding through the OUR Senior Thesis Research Funding Program.

More information about the OUR Senior Thesis Research Funding can be found here: https://undergraduateresearch.princeton.edu/funding/thesis-funding

General Advice

Selecting Good Projects

The goal of undergraduate research and independent work in Computer Science is to serve as a synthesizing experience in which undergraduates work on significant research or design projects. Given the broad diversity of intellectual problems in Computer Science and equally broad possibilities regarding future career trajectories, the style of your project can vary from theoretical to systems or applications-oriented, with output ranging from scholarly publications to working software or hardware.

Selecting a good project is usually the most important and trickiest part of the IW process.

There are many types of projects. Independent work in COS may require a significant programming effort, a theoretical study involving the design and analysis of algorithms, or an application problem in some other field. No one set of guidelines applies perfectly to projects of all types. However, that said, here are some guidelines to consider when choosing a project:

- Choose something you are passionate about.
- Choose a project with some aspect of novelty (a new app, a new algorithm, etc.).
- Choose a project with easy, medium, and hard milestones.
- Choose a project that can realistically be completed by the due date of the final paper.
- Think about how to evaluate the results before starting the project.
- Advisers may recommend changes to the scope of the project. Listen to them.
- Do not choose a project with unresolved dependencies (e.g., data sets, software licenses, etc.).
- Again, choose something you are passionate about.

Students can find examples of past senior thesis projects through the Mudd Library DataSpace. Students may search by topic, adviser, class year, etc. Click here to see example senior theses from the Class of 2024.

Selecting an Adviser

Students can reference the list of COS Independent Research Projects and faculty when looking for an IW or thesis adviser. Faculty will be regularly updating this web page with new research ideas.

Any Princeton faculty can advise a COS independent work project as long as there is a significant computer science component (check with the IW Coordinators if you are not sure). Many students have done interdisciplinary projects in the past, often advised by faculty in

another department or co-advised with a COS faculty. Note that the list linked above includes non-CS faculty who have done research with COS students in the past or are looking to do interdisciplinary projects with COS students in the future. **Students with an adviser who is not a SEAS faculty member, MUST have a secondary COS adviser.**

Note: Students must have an adviser confirmed before the first day of classes in spring junior year and in fall senior year.

Giving a Good IW Talk/ Oral Presentation

Each term, the department will offer an information session on "How to Give a Good IW Talk" before the oral presentations are due. Attendance is required for any students completing IW for the first time in that term. During the information session, one of the IW Coordinators will discuss slide design, how to organize the oral presentation and general public speaking tips. After the presentation, the slides will be posted to Canvas for future reference.

Example of past How to Give an IW Talk slides.

Below are some general guidelines for giving a good oral presentation:

- Practice: To improve an oral presentation, practice it; both alone and in front of others, before presenting live or before recording your presentation.
- Refine: Take seriously any feedback on your posture, eye contact, style, and energy, as well as the structure, organization, and content of your presentation.
- Know the Audience: Imagine that the audience is a group of senior Princeton undergraduates in computer science who are smart and have quite a bit of knowledge about computer science in general, but will not know the specifics of the particular research problem or area.
- Define: Clearly introduce the problem and the reason you are doing your research. Do not depend upon the audience to know specific jargon, nonstandard mathematics, the nuances of particular programming languages, or the specifics of certain software packages
- Be Convincing: Be a bit of a salesperson -- convince the audience that the ideas are useful or intriguing or ingenious, or astonishing. Try to leave the audience impressed by what has been accomplished and hoping to hear more about it at a later time.
- Cite Others: Cite other people or papers or software products during the presentation.
- Use Images: Use images or graphics to support your points wherever possible, minimizing the use of text on slides. In particular, do not put all the text you will say on your slides – so boring. The text on slides should be short sentences or phrases that convey key points after a quick glance, not sentences and paragraphs that provide the entire script for the talk. Many excellent research talks are composed almost exclusively of pictures and graphs.

- Be Organized: Slides should be well-organized, uncluttered, easy to read, and visually appealing.

Writing a Good IW/Thesis Paper

Each term, the department will offer an information session on "How to Write an IW Paper" before the written final papers are due. Attendance is required for any students completing IW for the first time in that term. During the information session, one of the IW Coordinators will discuss how to organize the paper, what to include in each section, and general writing advice. After the presentation, the slides will be posted to Canvas for your reference.

Example of past How to Write an IW Paper slides.

Recommended Outline:

- Abstract
- Introduction
- Problem Background or Related Work
- Approach
- Implementation
- Evaluation
- Conclusions and Future Work
- Bibliography
- Appendices (optional)

Time Management:

Talk to your adviser about how to write the final paper. It is usually best to start writing the paper early in the term and refine it continuously throughout the term. Talk to your adviser about exactly what they are looking for in the paper. The best papers are prepared with enough time for the adviser to read over a draft and give comments for revision.

Sample Papers:

Here are example single-term project papers and two-term theses from previous years.

Formatting Guidance

The written final paper should look like a professional document (e.g. 12pt Times-Roman font, 1-inch margins, double-spaced). That said, **there is no official required format** for a COS IW/ thesis paper. This includes the bibliography – there is no official formatting type required.

- Example template
- A.B. Juniors: LaTex and BibTex files for template for IW paper
- A.B. Seniors: LaTex and BibTex files for template for senior thesis paper

Below are general length guidelines based on whether a project is completed during one term, or two. That said, lengths of final papers vary wildly based on the specific COS subfield of research. Below is a chart of average pages for a small sample of A-papers, taken from a past "How to Write an IW Paper" information session:

Section	One-Term Projects	Thesis/ Two-Term Projects
Intro	Avg 1.5 pages	2-8 pages, avg. 3.5 pages
Related Work	Avg 4.5 pages	Avg. 7.5 pages
Approach	1-8 pages, avg. 3 pages	1-8 pages, avg. 3.5 pages
Implementation	Avg. 10 pages	Avg. 13.5 pages
Evaluation	Avg. 5.5 pages	Avg. 11.5 pages
Conclusion	Avg. 1.25 pages	1-7 pages, avg. 3.5 pages

Total Length:

- A.B.Juniors: final written papers for one-term projects should be 20-25 pages long.
- A.B. Seniors: final written papers for thesis projects should be 40-50 pages long.

Images:
Relevant charts, tables, diagrams, etc., should be included, with accompanying captions. Be sure to refer to each such chart in the main body of the text, clearly explaining its nature and purpose. The technique of "padding" papers using multiple, overly-large figures is well-known and should be avoided. Include auxiliary data such as lengthy code or auxiliary examples or detailed algorithms or long proofs, or supplementary data of other kinds, in a clearly labeled Appendix. The Appendix may be as long as is necessary -- it may extend beyond the page limit.

Other Information

Collaboration Policy

It is possible for groups of 2-3 students to work on different parts of the same large-scale project.

As an example, a few students might work together on a system for collaborative grading of assignments in MOOCs (massive open online courses), with one student developing the user interface, another designing the algorithms for assigning problems to graders, and a third implementing a system for integrating grader responses in the back-end server.

- **Each student must carve out a distinct part with a clear goal, novel idea, evaluation methodology, etc.**
- **Each student must submit their own work (i.e. proposal, checkpoint form, oral presentation, final paper).**
- **Each student will be graded separately.**

Every student is responsible for completing their own distinct work. This includes the project proposal, checkpoint form, oral presentation, and final paper, etc. Similarities in Motivation/Goal Background/ Related Work are expected, but each student must produce their own assignments and should cite partner work as necessary/appropriate.

Compliance and IRB

From the Office of Undergraduate Research (OUR):

The conduct of research involving humans, animals, unmanned aircraft systems, biosafety and managing conflicts of interest is highly regulated and raises a number of ethical questions. Princeton University is committed to upholding rigorous compliance and ethical standards while considering the care and welfare of all living subjects in the planning, review, approval, and implementation of proposed research. The Office of Research Integrity and Assurance (RIA) oversees the Institutional Review Board (IRB), Institutional Animal Care and Use Committee (IACUC), Institutional Biosafety Committee (IBC) and the Conflict of Interest (COI) in Research Panel. Independently, each committee is responsible for ensuring the ethical conduct of research through its review process.

IRB Info: https://undergraduateresearch.princeton.edu/compliance/human-research

Honor System

All work related to JRW, spring IW, and senior thesis must be conducted under the University's Honor System.

https://ua.princeton.edu/policies-resources/undergraduate-honor-system

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AI Tools

AI tools such as ChatGPT are completely prohibited for use when drafting/writing a paper and/or oral presentation. It is OK to use AI tools to help find datasets to work on, related research papers to read, tutorials and example code on how to use certain tools and packages; but if students do, they must **add a note in the paper or presentation to indicate when the AI tool was used.**

Statement from Dean Jill Dolan Regarding the Use of Generative AI:

Our existing academic integrity regulations govern how students may use generative AI. As you know, Princeton requires students to state the work they submit in a course is original and only their own (RRR 2.4.3). Just as students may not turn in someone else's work as their own, students may not misrepresent as their own work any output generated by or derived from generative AI.

COS IW & Thesis Equipment Collection

All IW and thesis equipment purchased using SEAS is returned to the department and entered into an equipment collection. Before requesting funding for equipment, please check the list of what the department already has on-hand.

Students who use SEAS funding to purchase equipment must return the equipment to the department at the end of their IW/thesis project.

Studying Abroad

A.B. juniors who plan to study abroad should plan to do so in the spring term. Special permission from the department is required for students to study abroad during the fall term of junior year. Please email Prof. Brian Kernighan, bwk (@princeton.edu), for more information about studying abroad.

All students who study abroad are expected to adhere to the same deadlines as any other IW student. You are responsible for either (a) finding a primary adviser abroad and a secondary Princeton faculty adviser, or (b) working remotely with a Princeton faculty adviser. You are expected to keep in regular contact with your adviser.

Campus Resources

McGraw Center for Teaching and Learning

The McGraw Center for Teaching and Learning offers several different programs to support student learning.

- Academic Life and Learning Strategies Consultations
    - **JP/Thesis**: Talk through any aspect of the project, from planning the work to working effectively with your advisor to clarifying the research question.
- Academic Strategies Workshops
    - Thriving at Princeton: Mapping Your term for Balance & Success
    - Time Management Strategies: Creating a Structured AND Flexible Routine
    - "Why do I keep putting things off?": Overcoming Procrastination
- Study Partners
- Resource Library
    - Breaking Down Large Projects Into Manageable Pieces
    - Mastering Independent Work
    - Senior Thesis on a Page

https://mcgraw.princeton.edu/

Princeton Engineering Library

Research consultations with Willow Dressel, Engineering Librarian wdressel (@princeton.edu) are available to students in-person, or by email, phone or Zoom.

https://libguides.princeton.edu/cs

Princeton Writing Center

The Writing Center can help with any part of the writing process: brainstorming ideas, developing a thesis, structuring an argument, or revising a draft. The goal is to develop strategies that will encourage students to become astute readers and critics of their own work.

https://writing.princeton.edu/writing-center

Princeton Office of Undergraduate Research (OUR)

The Office of Undergraduate Research (OUR) provides a wealth of resources for students. OUR provides individual and small-group advising for students who need help reaching out to potential faculty mentors; creating a plan to balance research, coursework, and personal responsibilities; reflecting on and processing research setbacks; and more.

OUR also has a student-authored research blog, where students share advice on various relevant research topics.

Finally, PURC, Princeton's Undergraduate Research Calendar, intends to help students navigate the many programming opportunities and resources available to support research endeavors at Princeton, including junior and senior independent work.

https://undergraduateresearch.princeton.edu/

Princeton Survey Research Center (SRC)

The Survey Research Center's (SRC) main purpose is to assist students, faculty and administrators with the design and implementation of their own survey research projects. The SRC provides consultation and guidance on study design, sampling, instrument development, data collection and data processing. The center has digital voice recorders, iPads, virtual telephone interviewing capability, web survey utility, a library collection on survey research methods and a network of external resources.

SRC Staff members are available to meet with students who are planning to conduct survey research projects. At the design stage, this requires consideration of alternative study plans, definition of a study population, selection of appropriate sampling methods and data collection techniques, and design of survey questionnaires and data analysis plans.

https://psrc.princeton.edu/

Data and Statistical Services (DSS)

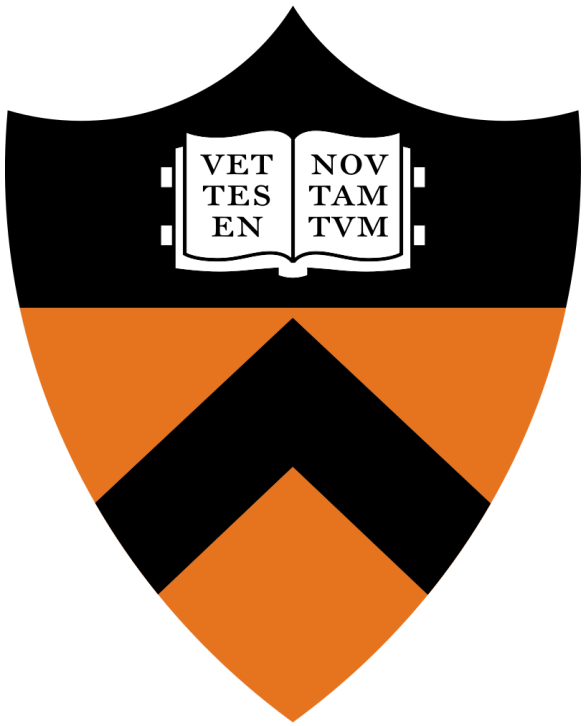
Data and Statistical Services (DSS) provides data and statistical consulting. Experts are available to advise Princeton University students, faculty, and staff on choosing appropriate data, application of quantitative research methods, the interpretation of statistical analyses, data conversion, and data visualization. Subject specialists help choose appropriate data. The statistical packages supported by consultants are R/R Studio and Stata. DSS provides limited help with Matlab, Python (for text mining and social science applications), SAS and SPSS. DSS provides statistical and software assistance in quantitative analysis of electronic data as part of independent research projects, such as junior papers, senior theses, term papers, dissertations, and scholarly articles.

https://library.princeton.edu/dss

Princeton Research Day (PRD)

Students are encouraged to submit their independent work or thesis projects for consideration to present during Princeton Research Day. Awards and monetary prizes are available.

https://undergraduateresearch.princeton.edu/programs/PRD


VET
TES
EN
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