

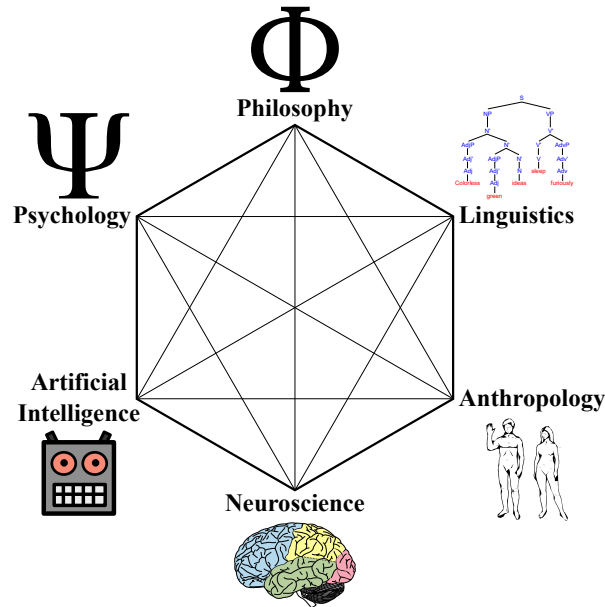
Introduction to Cognitive Science

Spring 2025

Tues / Thurs, 12:45pm–2:05pm

Kirkbride Hall, Room 204

(Visit the course Canvas site [here](#))



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1. General Information

Instructor

Dr. Tyler Knowlton (he/him)
Postdoc in the Linguistics & Cognitive Science department
Physical Office: 800 Barksdale Rd., Room 113B
Zoom Office: <https://udel.zoom.us/my/tknowlton>
Office Hours: Thursdays, 2:30–3:30pm
Email: tzk@udel.edu

To make sure we see any message you send, please **add “intro25” to the subject line of every email**. Note also that all assignments should be uploaded on Canvas, *not* emailed.

Teaching Assistants

Dominique Lopiccolo (she/her)
PhD Student in Interdisciplinary Neuroscience
Physical Office: Ewing Hall, Room 329
Zoom Office: <https://udel.zoom.us/my/dominique.lopiccolo>
Office Hours: Mondays, 1–2pm
Email: dlopicco@udel.edu

Hyejin Lee
PhD Student in Linguistics & Cognitive Science
Physical Office: Ewing Hall, Room 329
Zoom Office: https://udel.zoom.us/launch/chat?src=direct_chat_link&email=jinlee@UDel.Edu
Office Hours: Wednesdays, 3:30–4:30pm
Email: jinlee@udel.edu

You will be assigned a primary TA after the first week of the course; this person will be your first point of contact for help, and will also be the one evaluating your assignments. The TAs and the instructor will all keep regular office hours (listed above); you should feel free to visit any of our office hours (not just your assigned TA's).

About This Course

How do minds work? How does the brain give rise to the mind? Could a mind be implemented in a machine? Cognitive science addresses these questions and many others from an interdisciplinary perspective, drawing on methods and ideas from psychology, linguistics, philosophy, neuroscience, computer science, and anthropology. This course will provide a comprehensive overview of the field. Along the way, we'll explore topics such as perception, language, memory, learning, reasoning, decision-making, consciousness, cognitive disorders, and artificial intelligence.

This course has no prerequisites and does not assume any background knowledge of cognitive science or related disciplines; it just requires that you're curious about how your mind works!

If you're particularly interested in some of the things we talk about during the semester and want to get involved in cognitive science research yourself, there are always faculty in [Linguistics & Cognitive Science](#), [Psychological & Brain Sciences](#), [Communication Sciences & Disorders](#), [Education](#), and other departments who are looking for motivated student collaborators. If you'd like to learn more about this possibility, contact faculty at the links above directly, or get in touch with one of us and we'll point you in the right direction.

2. Materials and Format

Canvas

All course materials and communication are housed on [our Canvas page](#). This is where you should:

- View/Download Readings (available under “Files” or right on the home page under “Readings”)
- Find and Upload your [Reading/Lecture Responses](#) (available under “Assignments”)
- Check your Grades

Information on how to use Canvas is available through [this guide](#).

Readings



You do not need to purchase a textbook for this course. We will mostly use primary readings from scientific journals such as *Nature* and *Science* and long-form journalistic articles in *The New Yorker*, *The Atlantic*, or *Bloomberg*. Occasionally, a textbook chapter or an interactive “game” will be included in the reading list as well. **All readings will be posted as PDFs or links on Canvas.**

Class Format

Each class will consist of a lecture, usually by Prof. Knowlton, occasionally by one of the TAs or an invited guest. The lectures may not perfectly follow the readings; cognitive science is an extremely broad and diverse field, and there is more material worth covering than there is time to cover it!

Given the large, lecture-based format of the course, **a virtual option will *not* be available.** There will be copies of the lecture slides available online after class, but they will not contain very much text and so are no substitute for attending the lectures and taking good notes. If you miss a class, come see us during office hours!

There will also be **at least one interactive electronic “poll” per class which will count toward your participation grade** (see the [Participation](#) section below). We will use “Poll Everywhere,” which collects real-time responses from any computer or mobile device with internet access. At the beginning of the course, you will be invited to register with our Poll Everywhere account (PollEv.com/tknowlton). **Please follow the instructions for setting up and joining the course on Poll Everywhere [here](#).**

Note that participating in these polls requires that you have a (sufficiently charged) internet-connected device (laptop or smartphone) at each class. If doing so will prove difficult, talk to us as soon as possible. As a reminder, [the academic honesty policy](#) applies to the use of educational technology tools such as Poll Everywhere.

3. Requirements & Evaluation

Exams (60%)

There will be three in-class exams, worth **24%**, **24%**, and **12%** of your final grade. The percentage of your grade that each exam is worth depends on your performance, **with your lowest-scoring exam counting for the fewest points.**

Exams will be held **in-class using paper and pen/pencil (with no electronic devices allowed)**. This format offers significant benefits: it ensures fairness by testing everyone at the same time and under the same conditions; provides a distraction-free environment; allows for immediate support if any questions or issues arise; and eliminates potential technology problems like connectivity or software failures. If you require accommodations for this exam format, please contact the [Office of Disability Support Services \(DSS\)](#) as soon as possible (*before* the exams take place).

Exams will consist of **multiple-choice questions**. In some ways, this is not ideal, since short answer questions would allow more variety in the questions we ask and the answers you give. At the same time, those kinds of questions open the door to subjectivity in grading. So, we'll try to make the questions interesting and thoughtful, while also avoiding unfair "trick" questions. We'll also debrief as a group after each exam, to make sure things went smoothly and fairly. (As you'll see [below](#), there are opportunities to show your knowledge through writing as well.)

The exams are *not* cumulative, meaning that each exam will cover the material since the previous exam (or, for the first exam, since the beginning of the course). That said, the exams *are* cumulative in the sense that later exams may rely on concepts introduced earlier (e.g., the "brain" lecture will be early in the course, but later exams will still mention the brain). In any case, we want you to come away from the course with an integrated picture of what cognitive science is – and with knowledge of cool experiments to tell your family about next Thanksgiving – so try to avoid cramming the night before and letting all the knowledge leave your brain immediately after each exam.

If you think there's been a mistake in grading your multiple-choice exam, you can ask for a regrade, but only for specific questions where you believe there was a clear marking error (like mis-bubbled answers or scanning issues). To do this, **submit a written explanation to your TA within one week** of getting your results, explaining exactly what you think the error is, i.e., which question(s) you think were graded incorrectly. Only the questions you specify will be regraded, and once the regrade is done, the decision is final. This policy ensures that the grading is fair while also making sure you carefully review your exam before asking for a regrade.

The secret to success on these exams is simple: attend all the lectures and do all the readings. Here's some data to back that up: [these researchers](#) find that "early and consistent class attendance strongly correlates with academic performance" and [this meta-analysis](#) of education research argues that class attendance is "a better predictor of college grades than any other known predictor of academic performance, including scores on standardized admissions tests such as the SAT, high school GPA, study habits, and study skills. Plus, attendance (in the form of [Participation](#)) is part of your grade!

Reading/Lecture Responses (25%)

Approximately once a week, you'll complete a short "response" assignment (available [on Canvas](#)), which will be **graded pass/fail**. Your goal is to show you've completed (and caught the gist of) the readings and lectures; our goal is to encourage you to deeply engage with the material and apply it in new situations. If you have questions about the assignments, you're encouraged to attend the instructor or TAs' office hours or shoot us an email. The due date for each will be listed under [the "Assignments" tab on Canvas](#) as well as in [the "Assignments" column in the course schedule below](#). There are 10 responses planned, so each is worth 2.5% of your final grade (though this number is subject to revision). **These are not collaborative**

assignments, and must be done individually. You must turn in assignments **before the date and time they are due (i.e., before class)**. Assignments handed in between 1 minute and 24 hours after the due date/time will receive **half credit**. No credit will be given for assignments handed in later than 24 hours. **Responses must be uploaded on Canvas, *not* emailed.**

Participation (15%)

15% is a massive amount of points to give for participation, but this reflects how crucial active engagement and attendance are to succeeding in this course. To assess participation, we will use the “Poll Everywhere” real-time online poll system ([see the section on Class Format for details about signing up](#)). **There will be at least one poll during each lecture, and you will signal your presence in class simply by answering that question.** These are *not* quizzes, and **credit for responding does not depend on the particular response that you give**. In fact many of the questions won’t even have right answers in the first place (e.g., the questions might ask you to predict the outcome of a famous experiment, or to tell us whether you believe the language you speak affects what you see).

To assign a participation score at the end of the term, we will use the following system: **If you answer at least one poll question during at least 80% of the lectures, you earn 100% for participation.** But if you answer fewer than that, you earn *that* percentage for participation. So, someone who responds to poll questions for 85% of the lectures (as indicated by poll responses) earns 15/15 participation points, but someone who is present for only 60% of the lectures earns 9/15. This system excuses you from random mishaps or absences: If you miss a poll for any reason (e.g., if you are in the restroom just as a poll question goes up, your laptop or smartphone dies during class, or you are absent for religious holidays or athletic participation/other extracurricular activities), that lecture becomes part of the “freebies” afforded by your 20% buffer. **This also means we will not consider requests for makeup participation points; the 20% buffer is our way of excusing absences.**

Your Final Grade

Final letter grades will be assigned according to the scale below:

		B+	88-89%	C+	78-79%	D+	68-69%		
A	94% and above	B	84-87%	C	74-77%	D	64-67%		
A-	90-93%	B-	80-83%	C-	70-73%	D-	60-63%	F	<60%

Numerical grades will be rounded to the nearest integer before being converted into letters (e.g., 89.5% ⇒ 90% ⇒ A-; 89.49% ⇒ 89% ⇒ B+). Final grades will not be curved.

Extra Credit (Participation in Research Studies or Article Review)

You can earn up to 2% extra credit by (i) participating in cognitive science experiments and/or (ii) writing a short summary and review of a cognitive science research article. To receive extra credit, it must be completed/submitted **by the last day of classes (Thurs, 5/15)**.

(i) Participation in Research Studies: They are fun, and they help researchers learn how the mind works! Each one-hour of “credit” adds 0.5% to your final score (up to 4 credits total). Be on the lookout for messages from the professor or TAs about opportunities to participate.

- To receive credit, you’ll need to email a **100-word summary of your experience** (what the research was about, and what it was like to participate) to your TA (including “intro25” in the subject line, as always).
- Note:** You cannot “double-count” study participation. If you participate in a research study for monetary compensation or for course credit for another class, you *cannot* also receive credit in this class. If you’re unsure as to whether the study will count or not, email the professor or your TA.

(ii) Short Summary and Review of a Cognitive-Science Research Article: You may choose the article you'd like to review, but you should **contact your TA** to confirm that your choice is appropriate before completing the assignment. **Email your summary/review, along with the reviewed article, to your TA** (including "intro25" in the subject line). You will receive 1.0% extra credit per article review/summary. Your summary/review should include:

- A brief summary of the question, approach, results, and conclusion (~100 words)
- One thing you understood well from the article, explaining why it stood out to you (~100 words)
- One thing you didn't fully understand, and why you found it confusing or challenging (~100 words)
- What topic(s) from class does this article relate to, and how? (~100 words)

4. Course Policies

Academic Honesty

The Dean's Office provides this message about academic honesty:

Students must be honest and forthright in their academic studies. Students are expected to do their own work and must give proper credit for any work not their own. Students may neither give nor receive unauthorized assistance. Engaging in academic dishonesty, or allowing other students to do the same, corrupts the educational process and diminishes the quality of a University of Delaware degree. View the university's procedures for resolving academic dishonesty concerns here: <https://www.udel.edu/students/community-standards/conduct-process/>. Contact Community Standards & Conflict Resolution at communitystandards@udel.edu (218 Hulliher Hall, (302) 831-2117).

Note that no for-credit assignment or exam in this course is collaborative. That means that reading response assignments are to be written completely on your own, participation points should not be earned by asking someone to answer the interactive polls for you, and exams are to be completed by yourself. We'll do our best to craft questions that test comprehension rather than memorization (such that cheating wouldn't even be that helpful). And given our generous and flexible grading system — with [pass/fail grading on Responses](#), the [20% "cushion" for participation](#), and [having your lowest exam score count for the fewest points](#) — the odds that cheating will change your final grade are quite small anyway.

If you are ever feeling desperate enough that a few extra points in this course seem to be worth risking so much, *please* consider talking to someone first — that could be Prof. Knowlton, a TA, or even someone at the [Student Success Center](#) or the [Counseling Center](#). We want you to succeed, and we are happy to talk to you if you are feeling undue pressure from this course or anything else.

Policy on Use of AI Tools (e.g., ChatGPT)

We recognize that students may be tempted to use generative artificial intelligence (AI) tools (such as ChatGPT, Gemini, Llama, Claude, and DeepSeek) for assistance in their written assignments. However, we want to discourage reliance on these tools; learning happens best when you use your own "generative intelligence". Also, these tools are rife with biases and other ethical issues — some of which we'll even touch on at the end of this course. We want to hear what you think about the readings, not what a glorified tape recorder like ChatGPT can regurgitate! Still, we recognize that students may find it helpful at times to use such tools for inspiration or proofing. **If you utilize any such tools, you are required to explicitly acknowledge the AI-generated content through comments, footnotes, endnotes, or other markings.** You will not be penalized for such acknowledgements, but **no more than 20% of your work should be generated by AI. Lack of proper acknowledgement constitutes plagiarism and academic**

dishonesty, which may result in failure of the assignment or even the course. Students are responsible for understanding and avoiding plagiarism. **At the beginning of the course, you are required to explicitly acknowledge the above AI policy.** If any part of this is confusing or uncertain, please reach out to one of us before submitting your work.

Makeup Policy

Students who miss an assignment for reasons beyond their control can make up the work accordingly. Our [20% “cushion” for participation](#) ensures that occasional absences will not affect that portion of your grade. For exams, makeups will be handled on a case-by-case basis. Please make every effort to anticipate absences, and let your TAs or Prof. Knowlton know about them whenever possible (**and for exams, barring extenuating circumstances, you should do so before the exam occurs**).

Class Climate

Active engagement is crucial to learning in this course. Students are expected to:

1. **Ask questions.** It’s great to admit that you don’t know something. And asking questions, especially in a lecture class like this one, is a practice that you can get better at & more comfortable with. Also, if you’ve got a question, it’s a good bet that someone else in the class is wondering something similar and will be thankful that you asked! Of course, if you really don’t want to speak up in class, you can always bring your questions to office hours.
2. **Disconnect from technology.** You’ll learn better and won’t distract your peers if you limit your use of phones and social media. Please try your best to disengage for the duration of the lecture and only use your laptop/phone for taking notes and responding to Polls.
3. **Respect other students and the instructors.** Everyone has the right to be treated with dignity and respect in our classroom, and we are committed to making that happen. This not only means your instructors and TAs treating you with respect, but also you treating each other that way.

If you ever have concerns in this course about harassment, discrimination, or unequal treatment, we invite you to contact Prof. Knowlton or one of the TAs. We promise to take your concerns seriously and to seek mutually acceptable resolutions and accommodations. Raising such issues will never impact your grade. You may also share concerns with our Department Chair ([Prof. Robin Andreasen](#)) or [the Office of Equity & Inclusion \(OEI\)](#). See [below](#) for more information about UD policies and procedures on harassment, discrimination, and sexual misconduct.

Anonymous Feedback

We value your feedback at any time (before, during, or after the course). This will make the course better for everyone, including you — so please do share! Any feedback submitted using [this form](#) will be completely anonymous.

Accommodations for Students with Disabilities

Students with disabilities are offered accommodations, but first they must make themselves known to the Office of Disability Support Services (DSS) as soon as possible. To do so, visit [this link](#). Alternatively, contact DSS by phone: 302-831-4643; fax: 302-831-3261; website: sites.udel.edu/dss/; email: dssoffice@udel.edu; or visit 240 Academy Street, Alison Hall Suite 130 during business hours (8-5 M-F). They will in turn inform us of the approved accommodations.

5. Course Calendar and Reading/Assignments List

The schedule below is subject to change! FYI: The last day to Add/Drop a course is [Friday, Feb. 14th](#)

Date	Topic	Readings (complete before class)	Assignments (due before class)
Tue 2/4	Introduction to <i>Introduction to Cognitive Science</i>		
Thu 2/6	The Computational Theory of Mind	Clark, "Meat machines: Mindware as software" [up to section 1.2]	Response 1 & Intro survey
Tue 2/11	The brain	Fodor, "Diary: Why the brain?"	
Thu 2/13	NO CLASS	Eagles Super Bowl Championship Parade Day (Observed)	
Tue 2/18	Symbolic systems vs. neural networks	Bermúdez, "Physical Symbol Systems" & "Neural networks" [excerpts]	Response 2
Thu 2/20	Visual cognition	Gleitman et al., "Perception" [part 1]	
Tue 2/25	Vision in the brain	Gleitman et al., "Perception" [part 2]	
Thu 2/27	NO CLASS	Prof. Knowlton away	
Tue 3/4	Review session 1	Review the material covered so far and come with questions!	Response 3
Thu 3/6	Exam 1		
Tue 3/11	Mental imagery and representational format	Bermúdez, "Mental Imagery" [excerpt]	
Thu 3/13	Words and rules I	Pinker, "How language works" [excerpt]	
Tue 3/18	Words and rules II	Morton, "On recursive reference"	Response 4
Thu 3/20	Language acquisition and development I	Lidz & Knowlton, "From slugs to humans: What causes the change?"	
Tue 3/25 & Thu 3/27	NO CLASS	Spring Break	
Tue 4/1	Language acquisition and development II		
Thu 4/3	Spatial navigation	Epstein & Kanwisher, "A cortical representation of the local visual environment"	

Date	Topic	Readings (complete before class)	Assignments (due before class)
Tue 4/8	Memory (Guest lecture by Prof. Adrian Gilmore)	Frakt, "An ancient and proven way to improve memorization; go ahead and try it"	Response 5
Thu 4/10	Review session 2	Review the material covered since Exam 1 and come with questions!	
Tue 4/15	Exam 2		Practice exam 2 (= Response 6)
Thu 4/17	Cognitive development	Talbot, "The Baby Lab"	
Tue 4/22	Poverty of the Stimulus Arguments	Gallistel, "Learning organs"	
Thu 4/24	Social cognition and theory of mind	Krupenye et al., "Great apes anticipate ... false beliefs" Gergely et al., "Rational imitation in preverbal infants"	Response 7
Tue 4/29	Does language / culture shape thought?	Gleitman et al., "Language" [excerpt]	
Thu 5/1	Number	Feigenson et al., "Core systems of number"	
Tue 5/6	Philosophical puzzles	Bermúdez, Chapter 4 [pp. 88-92 only]	Response 8
Thu 5/8	Review session 3	Review the material covered since Exam 2 and come with questions!	
Tue 5/13	AI and CogSci (Guest lecture by Dr. Victor Gomes)	Nicoletti & Bass, "Humans are biased. Generative AI is even worse"	
Thu 5/15	Exam 3		Practice exam 3 (= Response 9)
Tue 5/20			Post-class survey (= Response 10)

6. General UD Academic Resources and Policies

The following are general academic resources and policies that apply across the university.

Additional Learning Resources

Do you need assistance with note-taking, time management, or study strategies? Check out the [Office of Academic Enrichment](#) for one-on-one academic coaching, tutoring, and study skills workshops.

Student Mental Health & Wellbeing

In addition to impacting your overall well-being, diminished mental health can interfere with optimal academic performance. If this course is causing or contributing significant mental or emotional stress, then please reach out to me directly. However, problems with other parts of your life can also contribute to decreased academic performance. UD's Center for Counseling & Student Development (CCSD) provides cost-free and confidential mental health services to help you manage personal challenges that threaten your emotional or academic well-being. Remember, getting help is a smart and courageous thing to do — for yourself and for those who care about you.

- **Contact me:** If you are struggling with this class, please check-in during office hours or contact the instructor by email.
- **Check-in with your academic advisor:** If you are struggling in multiple classes, unsure whether you are making the most of your time at UD, or unsure what academic resources are available at UD. You can see a complete list of advisors [here](#).
- **UD's Center for Counseling & Student Development (CCSD), TimelyCare, and UD Helpline:** CCSD provides cost-free and confidential mental health services promoting psychological wellbeing so that students can be more successful in their academic, personal, and career pursuits. CCSD provides in-person services including walk-in urgent visits, scheduled individual and group counseling, and consultation for students, parents, and faculty. CCSD partners with [TimelyCare](#) to provide scheduled counseling and health coaching via telehealth. For 24/7 mental health support, students have the option of calling the UD Helpline at 302-831-1001 or accessing TimelyCare's Talk Now service through the TimelyCare app or online. Visit [CCSD's website](#) for additional information and resources.
- **UD's Crisis Text Line:** Text "UDTEXT" or "STEVE" at 741741 connect with a professional who specializes in supporting students of color via a confidential text message.
- **Division of Student Life:** Our three wellbeing units—Student Health Services (SHS), Student Wellness and Health Promotion (SWHP) and the Center for Counseling and Student Development (CCSD)—are here to help you thrive both mentally and physically in your time as a Blue Hen and beyond. Come visit us on the South Green for all of your wellness needs! Explore the Student Life's [Wellbeing webpage](#) for a comprehensive listing of well-being resources, activities and services available to all students.

Harassment, Discrimination, and Sexual Misconduct

The University of Delaware works to promote an academic and work environment that is free from all forms of discrimination, including harassment and sexual misconduct. As a member of the community, your rights, resources, and responsibilities are reflected in the Non-Discrimination, Sexual Misconduct, and Title IX policy. Please familiarize yourself with this policy at the [University's Office of Equity & Inclusion website](#). You can report any concerns to the University's Office of Equity & Inclusion, at 305 Hulihan Hall, (302) 831-8063 or you can report anonymously through UD Police (302) 831-2222 or the [EthicsPoint Compliance Hotline](#).

- Read the [full policy](#)
- [File a report](#)

Faculty Statement on Disclosures of Instances of Sexual Misconduct

If, at any time during this course, I happen to be made aware that a student may have been the victim of sexual misconduct (including sexual harassment, sexual violence, domestic/dating violence, or stalking), I am obligated by federal law to inform the university's Title IX Coordinator. The university needs to know information about such incidents to, not only offer resources, but to ensure a safe campus environment. The Title IX Coordinator will decide if the incident should be examined further. If such a situation is disclosed to me in class, in a paper assignment, or in office hours, I promise to protect your privacy — I will not disclose the incident to anyone but the Title IX Coordinator.

For more information on Sexual Misconduct policies, where to get help, and reporting information, please refer to www.udel.edu/sexualmisconduct. At UD, we provide 24/7/365 crisis assistance and victim advocacy and counseling. Contact 302-831-1001 to get in touch with a sexual offense support advocate, as well as confidential and anonymous counseling services for other concerns.

Non-Discrimination

The University of Delaware does not discriminate against any person on the basis of race, color, national origin, sex, gender identity or expression, sexual orientation, genetic information, marital status, disability, religion, age, veteran status or any other characteristic protected by applicable law in its employment, educational programs and activities, admissions policies, and scholarship and loan programs as required by Title IX of the Educational Amendments of 1972, the Americans with Disabilities Act of 1990, Section 504 of the Rehabilitation Act of 1973, Title VII of the Civil Rights Act of 1964, and other applicable statutes and University policies. The University of Delaware also prohibits unlawful harassment including sexual harassment and sexual violence.

For inquiries or complaints related to non-discrimination policies, please contact: Office of Equity & Inclusion, oei@udel.edu, 305 Hullihen Hall Newark, DE 19716 (302) 831-8063

For complaints related to Section 504 of the Rehabilitation Act of 1973 and/or the Americans with Disabilities Act, please contact: Office of Disability Support Services, dssoffice@udel.edu, Alison Hall, Suite 130, Newark, DE 19716 (302) 831-4643 or contact the [U.S. Department of Education - Office for Civil Rights](https://www.ed.gov/office-for-civil-rights).