Syllabus for SCI 111: Brains, Minds, and Machines

Instructor: Dr, Susan L. Epstein, Professor of Computer Science
Class meets: Monday and Thursday 1 -2:15PM \ @ 1000 J, 10th floor, Hunter North
Office hours: In person Monday and Thursday 11:15-12:15 @1090C Hunter North or by appointment
Mode of instruction: P (in person)
Mode of exams: P (in person)
Email: susan.epstein@hunter.cuny.edu
Course website: On Blackboard, accessible through CUNYFirst with Chrome, Firefox, and Safari

Course description

3 hours, 3 credits. SCI 111 is an interdisciplinary science course that addresses current knowledge about how human brains, human minds, and artificially intelligent machines think. Students will learn about groundbreaking work that will provide insight into people, the apps they rely on, and the robots in their future. It is highly recommended for students considering any science major, and for students interested in thinking and problem solving. Course material is organized around three essential questions:

- What is in your head?
- How does that make you behave?
- How could we build a machine like that?

Required course materials

There is no required textbook. Extensive reading material will be posted on the course website. Some material is copyrighted and therefore **available only at Hunter**. To access it, you must log into the library while you are on campus. Plan accordingly and ask a librarian for help if you need it.
Audio and video: Many assignments will require you to watch video or listen to extended audio presentations. Transcripts may be available in some cases.
Slides: Slides become available immediately after class.

SCI 111 policies: no exceptions, no discussion, no excuses

All students will be graded equally in accordance with the rules set out in this syllabus. Under Hunter's Academic Integrity Policy, seeking special treatment beyond the rest of the class is obtaining an unfair advantage. To ensure fair and even treatment of all students, SCI 111 has **non-negotiable policies:**

- **Attend all classes and personally sign the attendance sheet during lecture.** Persistent lateness will eventually be counted as absence
- **Check the class Blackboard website daily.**
- **Read your CUNYfirst email** daily. Your Gradescope account will match your @myhunter address. Do not change it. **Gmail addresses are not acceptable**.
- **If you don't follow directions, you do not receive credit.**
- **If your answer is illegible, it is wrong.**
- **Submit** all work through **GradeScope on or before 11PM** on its due date.
- **Late work loses** 10% per 24-hour period for 3 days after its posted deadline. Any amount of time up to 24 hours loses 10%, 24 to 48 hours loses 20%, and 48 to 72 hours loses 30%,. After 72 hours, it receives a 0.
- **No late extra credit** will be accepted. Extra credit is due at the same time as the required material.
- **Regrade requests must be submitted through Gradescope within 48 hours after grades are posted.**
- **We do not offer makeup exams.** Failure to take any exam at the appointed time earns you a 0.
- **Electronics**: All cell phones, pagers, and other devices must be inaudible during class. Laptops and other electronic devices are to be used only for class related activities. Activities *not* related to class include but are not limited to Facebook, Twitter, TikTok, other social networking services, "surfing," email, and video services. Students whose electronic device disrupts the class or is used for anything other than class-related activities will lose 5 points from their class participation grade per occurrence.
- **You may not record this class** without express permission from the instructor**.**

Grading

Course grades are based on written assignments, two exams, and thoughtful, well-prepared class participation. You must be able to define important terms and explain ideas in clear, grammatical English.
Rather than entertain any reason for lateness (e.g., illness, ignorance, sorrow, vacation, equipment failure, extra-terrestrial viators), we drop your lowest assignment grade and average those that remain.

Assignments	50%
Midterm	20%
Final	20%
Class participation	10%

Students' responsibilities

• **Attend all classes on time and well prepared.** All reading, audio, and video assignments are to be done *before* class. They are a necessary resource, but lectures go far beyond them, and often reference the assignments. You are responsible for all assigned material, whether or not it is covered during class time. Be ready to ask, and to answer, questions on it. Detailed notes are highly recommended.
• **Check that your CUNYfirst email address is up to date.** We will only communicate with you about the course through your CUNYfirst address, and we will also use it on Gradescope and Blackboard. **Gmail addresses are not acceptable**. **If you are a transfer student**, Blackboard does not automatically update your email when you change campuses. To change your Blackboard mailing address, see https://writingcraft.commons.gc.cuny.edu/files/2020/07/ChangeEmailAddressSP13.pdf.
• **Regularly read all SCI 111 email at your registered Blackboard address.** Changes in assignments, clarifications, and instructions will often come by email.
• **Keep pace with the course.** The course schedule, required material, and assignments will appear on the Blackboard website. Be sure to **check it regularly for changes** as the semester progresses. Slides are available immediately *after* class. Take notes in class for greater clarity.
• **Watch the schedule.** Check the Blackboard website regularly for changes as the semester progresses.
• **Do not plagiarize.** Your work must acknowledge all help received from other people and provide reference to all sources used (e.g., book, paper, journal, web site). See **"How to avoid plagiarism"** on the class website.
• **Class participation** is strongly encouraged and is 10% of your grade. Your presence is necessary but not sufficient. Relevant questions count, as do accurate responses to questions posed in class by the instructor or another student. Questions that help us all understand the material in greater depth are particularly welcome.
• **Allocate adequate time for this course.** How much will depend upon your interest, your science background, and your ability to read and write about technical material. **Plan on at least 8 hours per week outside of class for SCI 111.**
• **Complete the form** at https://forms.gle/ohjZGbrgXQbeioUT8.

Assignments = reading + audio + video + written homework

All assignments are designed to increase your understanding of the material and must be done as the course progresses. Often, one will build upon the next, so **skipping assignments is *not* an option**. *It is not possible to do well in this course without doing the assignments thoroughly and submitting them on time.*
• **Reading, audio, and video assignments** require hours of careful study**.** If you do not do that work regularly and thoroughly, you will find the course extremely difficult. Exams will cover both assignments and class discussions.
• **Written assignments** require *hours* of thought and effort. They will be posted on Gradescope as the semester progress. **Plan on spending time on each assignment *over several days*.** You may discuss your ideas with one another, but you must do your own work**.** Answers must be coherent, in full sentences, and use appropriate technical vocabulary. All non-diagram material must be typed; diagrams must be neat and legible.
• Each written assignments must be submitted through **GradeScope on or before 11PM on its respective due date.**

How to do well in this course

- **Read** your CUNYfirst email daily.
- Watch the **deadlines** on the website carefully.
- Do the **assignments** regularly and thoroughly *before class.*
- **Attend** class faithfully and take detailed notes.
- **Ask** questions in class when you don't understand something.
- **Review and study** the slides, your notes, and the assigned material carefully.
- Do **written assignments** *over several days***.** Start early so you can ask questions in class or office hours.
- **Learn from your errors.** Similar questions may appear on later assignments or exams.
- Abide by the Department's Policy on **Academic Integrity**.

Anticipated course topics (subject to change)

Introduction to 3 disciplines	Psychology and cognition	Face recognition in the computer
Science as a process	Artificial neural networks	Navigation in the brain
The computer	Vision in the brain	Navigation in the mind
Artificial intelligence	Face recognition in the brain	Navigation in the computer
The neuron	Vision in the mind	Language in the brain
The brain	Face recognition in the mind	Language in the mind
Origins of cognitive psychology	Vision in the computer	Language in the computer

Thinking and communication

- **Talk to me: *Everyone*** is expected to participate in class. Ask questions. Express opinions. In return, I am happy to answer questions, listen to concerns, and talk to any student about topics related (or unrelated) to the class. I actually *enjoy* student visits during office hours. You can also make an appointment to see me at other times. I welcome your feedback throughout the semester about how the course is progressing.
- **Write to me:** You can reach me by email almost every day, but not late at night or very early in the morning.
- **Course website:** The course website is available on Blackboard and used in a variety of ways. Check it regularly, particularly for *schedule and assignment changes***.**
- **Be clear and correct:** Your work must be *legible and unambiguous*. A "yes or no" question requires a justification. If you don't understand a question, *ask me.*
- **Study groups:** Although study groups are not required, students who work together typically learn much more than those who work alone. The ideal group size is three or four. You are encouraged to form study groups to increase your understanding of the material.
- **Avoid hunting for answers online:** Much of what is out there, sadly, is either out of date or simply wrong. Remember, this is cutting-edge science.

Academic integrity

I take academic integrity seriously. It allows me to grade fairly and to ensure that your grade reflects what you have learned. Fair grading reflects on the quality of the Department, the quality of your degree, and the quality of Hunter College itself. *Giving and receiving answers is equally reprehensible.*

- You may discuss your ideas with one another, but **you must write and submit your own assignments and exams without directly copying someone else's.**
- You may not show your answers to a classmate or ask to see theirs, nor may you ask anyone to edit your answers.
- Plagiarism is unacceptable. Read the plagiarism handout on the course website to be certain you understand it.
- You may not post your answers where they would be accessible or seek help from online forums.
- Contract cheating is expressly forbidden. It is a kind of academic dishonesty where students have others do any coursework for them. For clarification see: http://en.wikipedia.org/wiki/Contract_cheating

Hunter College Policy on Academic Integrity: Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing the

CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.

• For the first incident of cheating or plagiarism your grade will be a 0. For the second incident, you will fail the class. **I report all such incidents to the Office of Student Affairs.**

Hunter's newly revised policy on academic integrity is effective immediately.

Academic dishonesty is prohibited in The City University of New York. Penalties for academic dishonesty include academic sanctions, such as failing or otherwise reduced grades, and/or disciplinary sanctions, including suspension or expulsion.

Academic integrity is at the core of a college or university education. Faculty assign essays, exams, quizzes, projects, and so on both to extend the learning done in the classroom and as a means of assessing that learning. When students violate the academic integrity policy (i.e., "cheat"), they are committing an act of theft that can cause real harm to themselves and others including, but not limited to, their classmates, their faculty, and the caregivers who may be funding their education. Academic dishonesty confers an unfair advantage over others, which undermines educational equity and fairness. Students who cheat place their college's accreditation and their own future prospects in jeopardy.

Definitions and Examples of Academic Dishonesty

Cheating is the unauthorized use or attempted use of material, information, notes, study aids, devices, artificial intelligence (AI) systems, or communication during an academic exercise. Example of cheating include:

- **Copying from another person or from a generative AI system or allowing others to copy work submitted for credit or a grade. This includes uploading work or submitting class assignments or exams to third party platforms and websites beyond those assigned for the class, such as commercial homework aggregators, without the proper authorization of a professor. Any use of generative AI tools must be in line with the usage policy for specific assignments as defined in the course of the syllabus and/or communicated by the course instructor.**
- **Using artificial intelligence tools to generate content for assignments or exams, including but not limited to language models or code generators, without written authorization from the instructor.**
- Unauthorized collaboration on assignments or examinations.
- Taking an examination or completing an assignment for another person or asking or allowing someone else to take an examination or complete an assignment for you, including exams taken on a home computer.
- **Submitting content generated by another person or an AI tool or any other source as solely your own work as your own, including, but not limited to, material obtained in whole or in part from commercial study or homework help websites, or content generated or altered by AI or digital paraphrasing tools without proper citation.**
- Fabricating and/or falsifying data (in whole or in part).
- Giving assistance to acts of academic misconduct/dishonesty.
- Altering a response on a previously graded exam or assignment and then attempting to return it for more credit or a higher grade without permission from the instructor.
- Submitting substantial portions of a paper or assignment to more than one course for credit without permission from each instructor.
- Unauthorized use during an examination of notes, prepared answers, or any electronic devices such as cell phones, computers, smart watches, or other technologies to copy, retrieve, generate or send information.

Plagiarism is the act of presenting ideas, research or writing that is not your own as your own. Examples of plagiarism include:

- **Copying another person's or an AI tool's actual words or images without the use of quotation marks and citations attributing the words to their source.**
- Presenting another person's ideas or theories in your own words without acknowledging the source.
- Failing to acknowledge collaborators on homework and laboratory assignments.

- Internet plagiarism, including submitting downloaded term papers or parts of term papers, paraphrasing or copying information from the internet without citing the source, or "cutting & pasting" from various sources without proper attribution.
- **Unauthorized use of AI-generated content; or use of AI-generated content, whether in whole or in part, even when paraphrased, without citing the AI as the source.**

Obtaining Unfair Advantage is any action taken by a student that gives that student an unfair advantage in his/her academic work over another student, or an action taken by a student through which a student attempts to gain an unfair advantage in his or her academic work over another student. Examples of obtaining unfair advantage include:

- Stealing, reproducing, circulating or otherwise gaining advance access to examination materials.
- Depriving other students of access to library materials by stealing, destroying, defacing, or concealing them.
- Retaining, using or circulating examination materials which clearly indicate that they should be returned at the end of the exam.
- Intentionally obstructing or interfering with another student's work.

Falsification of Records and Official Documents

Examples of falsification include:

- Forging signatures of authorization.
- Falsifying information on an official academic record.
- Falsifying information on an official document such as a grade report, letter of permission, drop/add form, ID card, or other college document.
- Falsifying medical documentation that has a bearing on campus access or the excuse of absences or missed examinations and assignments.

You can find the full document here https://hunter.cuny.edu/center-for-online-learning/online-learning-resources/academic-integrity-policy/

Learning Outcomes

This course satisfies the following Pathways Scientific World learning goals:

- Gather, interpret, and assess information from a variety of sources and points of view: Students will read material and watch videos of experiments on significant topics (e.g., vision), and then write about them from the perspectives of psychology, neuroscience, and computer science.
- Evaluate evidence and arguments critically or analytically: Students will examine data from experiments and identify evidence that supports or contradicts their hypotheses,
- Produce well-reasoned written or oral arguments using evidence to support conclusions: Students will write about their reading on assignments and examinations.
- Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world: Students will explain how brain behavior can be detected and measured, and how computer scientists' model biological processes.
- Articulate and evaluate the empirical evidence supporting a scientific or formal theory: In written assignments and on examinations, students will identify and explain significant methods and results in the science of thinking.
- Understand the scientific principles underlying matters of policy or public concern in which science plays a role: Students will understand and be able to explicate how science advances iteratively, and the role of the scientific community, peer review, and funding in the scientific development of knowledge

Want to learn more?

Students often ask for additional reference material. Here are some suggestions:

• A wonderful book on the scientific process, *Ignorance: How it Drives Science* by Stuart Firestein.

• If you enjoy Oliver Sacks' stories, try one of his books. *The Man Who Mistook His Wife for a Hat* and

An Anthropologist on Mars are both posted on the class website.
• If you are interested in the philosophical aspects of AI, *Gödel, Escher, Bach: An Eternal Golden Braid* by Doug Hofstadter is a terrific read.

Policy on bullying

Bullying, cyber bullying, online hate, initialization intimidation, threats, harassment, and pressure to share schoolwork are all forms of violence, CUNY holds a zero-tolerance stance toward all such acts. The University is committed to prevention of any form of bullying, will respond promptly to threats and/or acts, and will protect victims of bullying from retaliation. As a criminal matter the New York Attorney General defines cyberbullying as the use of email, websites, instant messaging, chat rooms. text messaging, and digital cameras to antagonize and intimidate others. Disrupting a teleconferencing platform (such as Zoom, Skype, Blackboard Collaborate Ultra) is a federal crime.

ADA compliance policy

In compliance with the ADA and with Section 504 of the Rehabilitation Act, Hunter College is committed to ensuring educational access and accommodations for all its registered students. Hunter College's students with disabilities and medical conditions are encouraged to register with the Office of AccessABILITY for assistance and accommodation. For information and appointment contact the Office of AccessABILITY located in Room E1214B or call (212) 772-4857 /or VRS (646) 755-3129.

Hunter College Policy on Sexual Misconduct

In compliance with the CUNY Policy on Sexual Misconduct, Hunter College reaffirms the prohibition of any sexual misconduct, which includes sexual violence, sexual harassment, and gender-based harassment retaliation against students, employees, or visitors, as well as certain intimate relationships. Students who have experienced any form of sexual violence on or off campus (including CUNY-sponsored trips and events) are entitled to the rights outlined in the Bill of Rights for Hunter College.
a. Sexual Violence: Students are strongly encouraged to immediately report the incident by calling 911, contacting NYPD Special Victims Division Hotline (646-610-7272) or their local police precinct, or contacting the College's Public Safety Office (212-772-4444).
b. All Other Forms of Sexual Misconduct: Students are also encouraged to contact the College's Title IX Campus Coordinator, Dean John Rose (jtrose@hunter.cuny.edu or 212-650-3262) or Colleen Barry (colleen.barry@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Hunter East 1123.
CUNY Policy on Sexual Misconduct Link: http://www.cuny.edu/about/administration/offices/la/Policy-on-Sexual-Misconduct-12-1-14-with-links.pdf
Thank you for abiding by these policies. They make current and future students' experiences equitable and safe.

Acknowledgements

Scholars acknowledge their sources. Special thanks to Ellen Hildreth, Nancy Kanwisher, William Sakas, The National Science Foundation, and The Center for Brains, Minds, and Machines, who have made this course a reality. Thanks too to Yevgeni Berzak, Idan Blank, Michael Cohen, Geoff Hinton, Nancy Kanwisher, Boris Katz, Yann LeCun, Tom Mitchell, Hector Penagos, Tomaso Poggio, Hugo Spiers, Mubarak Shah, Julia Sliwa, Ioannis Stamos, Josh Tenenbaum, Matt Wilson, Mike Wiest, and Phil Zeigler, from whose material some of this course was adapted. To receive 5 extra credit points on your first assignment, email me a photo of your favorite dessert (not desert!) before 9AM on Thursday, September 5, 2024.

Note: Details of this document, including grading percentages, are subject to change if the need arises.