HUNTER COLLEGE
SCHOOL OF EDUCATION &
SCHOOL OF ARTS AND SCIENCES

BIO/CHEM/PHYS/PGEOG 630 **Spring 2021**
SCIENCE AND SOCIETY **3 Credits**

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Required Texts:

1. The Double Helix: A personal account of the discovery of the structure of DNA by James Watson. *(1980 Norton Critical Edition)*, editor Gunther Stent, W.W. Norton, ISBN 0-393-95075-1. (Any edition will do; I would recommend a used copy). Cost new: $9.50
2. The Republican War on Science by Chris Mooney (2005). Basic Books. ISBN 0465046762. (any edition if fine). Cost new: $12
3. (Optional: Lecture note taking aid; "Making the Invisible Visible" on my dropbox

Class Time: Mon. 7:10 to 9:40 Room: Zoom

Office Hours: after class is a good time and by appointment

Course Description:
This course has three main parts. The first part involves the Nature of Science and centers on the rise of experimental science, what science means, and a philosophical description of science. The second part involves how scientists from different disciplines work in their labs. Articles in the sociology of science as well as biographies of scientists will be read in order to appreciate and understand the interplay between the personal and the professional, and to dispel common misconceptions of how scientists work and how they are described in popular culture. The third and last part of the course underscores the social and historical aspects of science. Here we will examine standards of behavior and ethical considerations, and look at case studies such as evolution, reproduction technologies, nuclear energy, and radiation. Students will make presentations on select topics and write lesson plans that infuse the philosophy, history, and social aspects of science into classroom activities. This course is constructivist in nature, meaning that students will actively participate in the pursuit of meaning by involving themselves in critical reading, making oral presentations, writing, working in groups, and arguing for their beliefs.

Description of Assignments

1. 14 Summaries. Try to describe the big picture, the author's argument, findings or conclusions. These summaries can act as your notes for when you take your exam. All summaries will be returned to you with a check or an R meaning that a revision is needed for credit. Logs only count on the day they are due. Each is worth 10 pts. A late reading log does not get any credit except if previously absent. If a revision has to be made only 5 pts will be rewarded. If less than 10 reading logs are handed in you will automatically fail this course.

   There are a variety of ways summaries can be expressed. I want you to try different types; here is the break down:

   Reading Log = 3
   Expository summary: 4
   Concept map: 3
   Outline with bullets: 4

2. Project and Presentation (School of Education Key Assessment #8):

   Objective: Student Lesson Plans will provide examples that demonstrate relationships between science and social and cultural values. You must discuss the choice of your topic with me beforehand.

   You can use Microsoft PowerPoint or Visio to help you organize your presentation. Your presentation should be about 15-20 minutes. (Important: To improve visibility use white letters on a black background, or yellow on a blue background; also I don't recommend using a font lower than 66 point; Ariel is a pretty good font to use.).

   a. About one fourth of the class will do a PowerPoint presentation investigating the intersection and differences between science, magic, and pseudoscience. Choose a science topic that can be related to a pseudoscience topic and a magical act. For example, the science topic of gravity can be associated to the magic of levitation, and can be loosely related to the pseudoscience of ear candles where wax is supposedly suctioned from your ear (overcoming gravity). During your presentation you want to elucidate the differences and similarities between science, magic and pseudoscience.

   b. About one fourth of the class will do a Case Study Ethical Dilemma: Students will make a PowerPoint presentation on a science topic and its relationship with society. Choose a science curriculum standard that you teach and develop the societal issues surrounding it. Just enough science should be discussed to make the presentation understandable (about 5 minutes), with the emphasis on positive and negative social issues. Make sure your topic has an ethical dilemma that the class can resolve. For instance, the topic of nuclear energy has a lot of pros and cons and is not one sided like cigarette smoking.

   c. About one fourth of the class will do a Nature of Science (NOS) Lesson Plan. You will create a lesson to teach students about one or more characteristics of science. Talk about the science, the NOS characteristic you want to focus on, and then discuss a lesson plan bringing these parts together. You must use the following website (trust me here, it is great for this topic): http://undsci.berkeley.edu

   d. About one fourth of the class will present a Lesson Plan involving some aspect of History. Divide the presentation into thirds: one part history, one part science, one part how you will bring both together into a lesson.

3. In place of a scheduled class, you will attend a conference conducted by the Science Council of New York City (SCNYC). Due to the virtual character of this conference, I will allow you to choose other online workshops given by other organizations such as:

   The New York Academy of Science
   Museum of Natural History
   New York City Skeptics
   Science Teachers Association of NYS (STANYS)
   STEMteachersNYC
   The Story Collider (science stories as performance)
   And look for any Professional Development Workshops in Science
   You will write and hand in a 2-3 page summary of the workshop that you attended. This is due on the last day of the course.

4. Lesson Plan Set: You will hand in 2 lesson plans involving postmodern science, 2 lesson plans involving magic/science/pseudoscience, 2 lesson plans involving a Case Study Ethical Dilemma, and 2 lessons involving the history of science. You will email me, in one file, the entire set of lesson plans at the end of the semester. You can work together and share lesson plans, but it must be in your own words. Failure to do so is plagiarism and an automatic F for the course.

Grading

1. Summaries (15)	25%	90-100%	A/A-
2. Presentation (Key Assessment)	25%	80-89%	B+/B/B-
3. Conference or Workshop Summary	15%	70-79%	C+/C/C-
4. Set of Lesson Plans	35%	60-69%	D
		0-59%	F

Class Policies:

1. Class Participation: Since this is a constructivist based class where meaning is generated in class as well as outside the classroom, your participation in discussions is very important. Therefore, read the assigned chapters or articles before class and be prepared to ask a question or make a comment. Grading papers or performing unrelated work while in class will not be tolerated.
2. Student presentations must be completed on assigned dates; a deduction in grade will be imposed if a student does not concur.
3. Please notify me immediately if you require any special adaptations to meet the requirements of this course. Arrangements can be made to accommodate a variety of needs to insure the success of all students.
4. Attendance to all class meetings is required. I will accept 2 absences. On the third, your grade is lowered by 2/3 of a letter grade. On the fourth absence, you have to retake the course. There are no exceptions. Illness and parent-teacher nights are built into the allowed absences. I will allow students to recover 1 absence by doing an independent project that is mutually agreed upon.
5. Incompletes will only be given for major medical reasons.
6. All assignments must be completed to pass the course.
7. If plagiarism is proven, it will result in an F and/or an F in the course.
8. Lateness: If you are over half an hour late to class it counts as ½ of an absence; if you leave half an hour or more before the end of the class it also counts for ½ of an absence.
9. Please do not use your laptops or cell phones for anything that does not directly pertain to the present lesson. No surfing the Internet, no personal calls, no doing day job work. The second warnings will result in a lowering of your final grade by one letter grade.

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.

It also resolved, "that the faculty at Hunter College are encouraged to use commercial and non-commercial devices to prevent and detect some forms of plagiarism and to educate and promote student commitment to academic integrity." One commercial product that is available to faculty is Turnitin.com. If you choose to use this product or any other instrument, then the students in your classes must be so informed. Several issues with respect to copyright and other legal questions have been raised by students and faculty. Many of these issues are addressed in the Turnitin.com website http://www.turnitin.com/. Click on "Legal" and then "U.S. Legal Document". To view the entire Hunter College Academic Integrity Policy and Procedure, please go to the Hunter College Senate homepage at http://www.hunter.cuny.edu/senate/ and click on "Documents". If you have any questions about college policies and procedures concerning academic integrity, please contact the college's academic integrity officer, Dean Michael Escott: extension - x4876 or e-mail: michael.escott@hunter.cuny.edu.

Expectations for Written Proficiency in English

Students must demonstrate consistently satisfactory written English in coursework. The Hunter College Writing center provides tutoring to students across the curriculum and at all academic levels. For more information, see http://rwc.hunter.cuny.edu. In addition, the School of Education offers a reading/writing workshop during the semester to students who need additional work honing their reading and writing skills. To register for this course, students must obtain permission either from the Chair of Curriculum & Teaching or the Associate Dean.

Accomodations for Students with Disabilities

In compliance with the ADA and with Section 504 of the Rehabilitation Act, Hunter 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 E1214 or call (212) 772-4857 /or TTY (212) 650-3230.

Week	Topics	Home Work: Readings and Assignments (S=Summary)
1 (2/01)	**The Content Domain** **(The Nature of Science)** Hawthorne's "Birthmark" Ted Talk, Hankins Syllabus Summaries: Reading Logs, Concept Maps, Expository, Outline	Dropbox: sdemeo@hunter.cuny.edu Pass: hunterdropbox HW: Kolata-Lactic acid (no S) McComas (S)
2 (2/08)	OZ Kolata-Lactic acid McComas	HW: Stepan (S) Shapin (S)
3 (2/22)	**The Context Domain** **(1. Heirarchy, Authorship, Communication)** (Assign Projects) Definition of Science Nature of Science (NOS) Video Stepan Shapin	HW: Hall (S) Djerassi (S) Yaes (S)
4 (3/01)	Hall Yaes Djerassi	HW: Zenzen & Restivo (S) Latour (S) Kolata-Lab… (no S necessary)
5 (3/08)	Zenzen & Restivo Latour Kolata-Lab…	Prepare presentations; Read Double Helix (due 2 weeks; divide into 2 Ss)
6 (3/15)	**(2. Science, Magic and Pseudoscience)** *Presentations*	HW: Double Helix (2 Ss due next meeting) famous paper from Nature is in reader
7 (3/22)	Franklin Perspective (video) Double Helix – Watson Perspective	Read Republican War on Science (read first 8 chapters; due in 3 weeks). Divide into 2 Ss
8 (4/05)	No Class Meeting (my class only; Hunter is open) This is in place of your attendance at a Professional Conference or Workshop	
9 (4/12)	*Nature of Science Lesson Plans*	Read Republican War on Science (read first 8 chapters; due in 2 weeks). Divide into 2 Ss
10 (4/19)	Prior Knowledge Frankenstein Frankenstein (video) Fallout and Sci vs. Tech Group popular culture discussion Sponge Bob vid.	HW: Republican War on Science) (read first 8 chapters; 2 Ss due next meeting)
11 (4/26)	Republican War on Science Story of Stuff (video)	HW: Deresiewicz (S) Fabre (S)
12 (5/03)	**(3. Societal Case Studies)** Fabre and Evolution Fast Food Nation Deresiewicz	HW: Aviv (S) Prepare presentations
13 (5/10)	*Ethical Dilemma Presentations*	Prepare presentations
14 (5/17)	*Historical Case Study Lesson Plans*	
15 (5/24)	Lesson Plan Set is Due Summary of Conference is Due	

Hunter College Conceptual Framework

Preparation of reflective, knowledgeable and highly effective teachers, counselors, and administrators

Evidence–Based Practices

The School of Education grounds its course content in the best field-based research and practice. Faculty review findings from their respective disciplines to provide our candidates with the strategies needed for effective instruction. Our candidates master the theory and practice of effective pedagogy in their subject areas, and acquire the tools for reflection on and improvement of their professional work. They achieve a solid foundation in the history, philosophy, psychology, sociology and methodology of education that enriches their teaching. Candidates gain expertise in analyzing and using assessment of student performance to guide their instruction and create optimal learning environments for students.

Integrated Clinical Experiences

The School of Education ensures that its candidates understand and experience the realities of school contexts. We establish strong connections with partnering schools in New York City and surrounding areas. We provide extensive fieldwork with supportive supervision in these schools. Our candidates engage in carefully sequenced and comprehensively assessed clinical experiences prior to their graduation

Educating a Diverse Student Population

The School of Education provides its candidates with the critical skills and understanding necessary to be responsive to the multiple challenges of all learners: students with a wide range of backgrounds, cultures, abilities and prior knowledge. We teach candidates to create humane and ethical learning communities in their classrooms and schools. They gain the ability to collaborate successfully with parents, families, community members, school faculty and staff in order to provide this support.

Use of Technology to Enhance Learning

The School of Education prepares candidates with the practical and theoretical knowledge of effective and judicious uses of technology in a variety of school settings and for a broad spectrum of learners. Formative and summative assessments of our candidates' technology competencies are a critical component of preparing them for tomorrow's schools. We believe that appropriate uses of educational technology enhance learning, assessment and communication.

Integration of Conceptual Framework:

- Evidence-Based Practices: Introducing instructional strategies to teach the Nature of Science in the Classroom
- Integrated Clinical Experiences: Attending a science education conference
- Educating a Diverse Student Population: Social, cultural and ethical aspects of science are discussed and assessed.
- Use of Technology to Enhance Learning: PowerPoint and poster presentations

Articles and Sections of Books we will be reading (acquire these on your own):

1. Hankins, T. L. *Science and Enlightenment*, Cambridge University Press, London, 1985; pp 1-3.

2. Ziman, J., What is Science? (1981). *Introductory Readings in the Philosophy of Science*, Klmebke, Hollinger, and Kline Eds. Prometheus Books, Buffalo, NY; pp. 35-54.

3. Kolata, G. (2006). Lactic Acid Is Not Muscles' Foe, It's Fuel. The New York Times. May 16, pp. 1-3.

4. McComas, W. F. The Principal Elements of the Nature of Science: Dispelling the Myths. Online.

5. Stepan, N. L. (1986). Race and Gender: The Role of Analogy in Science. *ISIS*, 77, 261-277.

6. Shapin, S. (1989). The Invisible Technician. *American Scientist*, 77, 554-563.

7. Hall, S. S. (1998). Lethal Chemistry at Harvard. *The New York Times Magazine*, Nov., 120-128.

8. Djerassi, C. (1989). *Canter's Dilemna*. Doubleday, New York, pp. 81-93.

9. Yaes, R. (1980). The Science Establishment. In Science and Liberation, Arditti, Brennan, & Caurak. South End Press, Boston, pp. 217-238.

10. Zenzen, M.; Restivo, S. (1982). The mysterious morphology of immiscible liquids: A study of scientific practice. *Social Science Information*, *21*, 3, 447-473.

11. Latour, B. (1983). Give Me a Laboratory and I will Raise the World. In *Science Observed* by Knorr-Cetina & Mulkay, eds. Sage Publications, London, pp. 141-170.

12. Kolata, G. (1993). Labs, a Scientist's Foreign Country. *Education Life*, *New York Times*, April 4, p. 19.

13. Watson, J. The Double Helix: A personal account of the discovery of the structure of DNA. Penguin: London, 1999.

14. Mooney, C. *The Republican War on Science*. Basic Books, New York, 2006. Part 1 only.

15. Deresiewicz, W. (2009). Lab Test: Who Profits From Scientific Research? *The Nation*. February, 26, pp. 1-17.

16. Fabre, J. H. (1901). Chapter 20: The Modern Theory of Instinct. Insect Life: *Souvenirs of a Naturalist*. Macmillian, New York, pp. 385-411.

17. Aviv, R. (2014). A Valuable Reputation. *The New Yorker*, Feb. 10, pp. 1-22.

Videos Used: The Birthmark, Photo 51, Frankenstein, The Story of Stuff

Bio/Chem/Phys/Pgeog 630 (Science and Society: Science Education Conference)

Date: _____ Candidate Name: _____

NSTA Standards
Standard 6a: Engage in professional development opportunities in their content field such as talks, symposiums, research opportunities, or projects within their community.

Standard 6b: Engage in professional development opportunities such as conferences, research opportunities, or projects within their community.

-- Assignment Description and Learning Outcomes
Learning Outcomes

1. The teacher candidate successfully attends a Science Education Conference hosted by SCONYC (Science Council of New York City). This is an annual, local conference that consists of biology, chemistry, physics and earth science education presentations, workshops, exhibits and vendors. Teacher-candidates participate by self-selecting activities based on their content area. A certificate of completion awarded by SCONYC is awarded as evidence of their 8-hour participation. Candidate submits the certificate of completion and list of conference sessions attended that represent both content-area specific sessions and broader science education sessions. This event represents 10% of the teacher-candidates grade.

Scoring Rubric **Evaluator's Signature:**

L.O.	NSTA Standard	0 (fails to meet outcome)	1 (meets standards)	Score	Comments (required if score is < 1)
1	6a	The teacher candidate does not attend the conference OR does not participate in at least one conference session that is related to his/her content area AND/OR no certificate of completion and/or list of sessions attended are handed into the instructor.	The teacher candidate attends the conference and participates in at least one session that is related to his/her content area AND a certificate of completion and list of sessions attended are handed into the instructor.		
1	6b	The teacher candidate does not attend the conference OR does not participate in at least one conference session that is related to science education, more broadly AND/OR no certificate of completion and/or list of sessions attended are handed into the instructor.	The teacher candidate attends the conference and participates in at least one session that is related to science education more broadly AND a certificate of completion and list of sessions attended are handed into the instructor.		

Recall that a score lower than a 1 requires that a student will not meet a standard and must be reassessed.