SEDC 72900 - Methods 2

Department Of Curriculum & Teaching / Computer Science Education

Hunter College, CUNY

Spring Semester 2022

Professor: TBD

Office Hours: TBA And By Appointment

Course Description

This course will prepare teacher-candidates to use a variety of pedagogical techniques including both general and those specific to teaching computer science. Teacher-candidates will also become knowledgeable in social and ethical issues related to computer science and computing including privacy, cyber bullying, and piracy. Teacher-candidates will learn to use a variety of technical tools to both administer their class as well as to support instruction and learning. Within each of the specific topics, attention will be paid to working with diverse populations as well as aligning lessons to the proposed CSTA standards. Additionally, topics such as classroom management techniques, questioning, and using assessments to drive instruction will be woven throughout all of the units.

Grading

- 40% : Demonstration of an understanding of CS teaching methods through class discussion, breakout rooms, small presentations.
- 40% : Use of effective methods in delivery of Topics project
- 20% : participation

Texts

N/A

Standards note

There will be a brief overview of the NY State Standards in week 2. A more thorough study of the standards takes place in the Curriculum Development class.

Specific standards coverage:

Area	Standards Covered
IC	1,2,3,4,5
CT	1,2,3,4,5,7
NSD	3
CY	2,3
DL	2,3,4,5,7

Weekly syllabus:

1. Review of CS Educational experiences

2. Python introduction, environment setup,review of CS learning resources for students and teachers ; review of standards.

   - Assignment:L review of APCSP and APCSA curricula.

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3. Data driven Assignments, using real world data, relevant assignments

   - Study of NYC Data Mine
   - Other real world data sources
   - Integrating student experiences into lessons
   - Assignment: Design a data driven assignment
   - CT 1,2,3

4. Managing a CS class, introduction to differentiating instruction in a CS class, scaffolding

   - Differentiated instruction video: https://www.youtube.com/watch?v=yNpEtrulPIg&t=190s,
   - Assignment: modify the real world data assignment to add differentiation

5. Leveraging Current events in computer science

   - Finding appropriate current events resources
   - Truth in current events resources
   - Bias and ethical concerns in current events resources
   - Assignment: Daily Digital
   - IC 1,2.3,4,5
   - CY 2,3

6. Choosing appropriate tools / languages for learning objectives

   - Survey of languages (Scratch, NetLogo, P5js/Processing)
   - Comparison of language strengths to learning outcomes
   - Environmental extras (Scratch and Repl.it's network infrastructure, Processing and Python's library ecosystems).
   - Assignment: Design a lesson that exploits a particular tools strength to enhance student learning of CS.

- DL 2,3,4,5,7

7. Using Collaborative tools

   - SysAdmin and SiteAdmin in the CS classroom
   - Repl.it / Scratch vs local hosting (pair programming for example)
   - Reading: Griffin and Seals
   - Assignment: Create github classroom with feedback and grading mechanism
   - DL 2,3,4,5,7

8. Copying vs collaborating (and related ethical issues), plagiarism, getting to the right learning resources, peer instruction

   - verifying assignments and student work
   - good vs bad resources for students (stack overflow)
   - Reading: Calif and Goodwin

9. Learning by getting things wrong

   - test driven development
   - discovery learning
   - Reading: Selections from Shore and Watson
   - CT 9
   - NSD 3

10. HW , Assessment, and project design

    - Spiraling in CS
    - multi-stage assignments
    - Assignment management over time
    - Assignment types: programming, code analysis, Parsons problems etc.

11. Code review as a pedagogical tool

12. Code reading

    - incremental problems
    - leveraging existing code
    - code and documentation reading
    - Reading: Griffin
    - Reading: Santo
    - CT 4,5,7

13. Teaching CS problem solving strategies

    - Decomposing problems
    - Code tracing
    - Using examples
    - Defining subproblems

14. Student Sample Lessons

Learning Outcomes

By the end of this course, students will be able to: - develop coherent, meaningful goals, plans and materials. - Plan and deliver effective computer science instruction. - Employ sound questioning techniques and facilitate effective class discussions. - assess learning and differentiate instruction for diverse populations. - Employ a variety of effective pedagogical standards in order to deliver instruction aligned with the proposed CSTA standards. - Use current technology and CS content and will be able to learn new technologies and content.

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- Teacher-candidates will be able to develop coherent, meaningful goals, plans, and material
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Required readings

- Anon, 2016. AP Computer Science Principles, Curriculum. College-board.org. https://secure-media.collegeboard.org/digitalServices/pdf/ap/ap-computer- science-principles-course-and-exam-description.pdf
- Terry Griffin and Shawn Seals. 2013. GitHub in the classroom: not just for group projects. J. Comput. Sci. Coll.28, 4 (April 2013), 74-74.
- Jean Griffin. 2015. Worked Examples with Errors for Computer Science Education. In Proceedings of the eleventh annual International Conference on International Computing Education Research (ICER '15). ACM, New York, NY, USA, 261-262. DOI: http://dx.doi.org/10.1145/2787622.2787741
- Santo, J., 2016. One Sure-Fire Way to Improve Your Coding. Changelog. https://changelog.com/posts/one-sure-fire-way-to-improve-your-coding
- Mary Elaine Califf and Mary Goodwin. 2005. Effective incorporation of ethics into courses that focus on programming. SIGCSE Bull. 37, 1 (February 2005), 347-351. DOI=http://dx.doi.org/10.1145/1047124.1047464
- James Shore and Shane Warden. 2007. The Art of Agile Development (First ed.). O'Reilly. https://poetiosity.files.wordpress.com/2011/04/art_of_agile_development.pdf

Recommended Readings

TBD

Academic integrity Statement

"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." ADA Statement "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 E1214 or call (212) 772-4857 /or TTY (212) 650-3230."