CD 145 / ED 182: **Technological Tools for Playful Learning**

Spring, 2018

Tuesday9-11:30am

Curriculum Lab at the Eliot-Pearson Department of Child Study and Human Development

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COURSE DESCRIPTION

This course explores the design and use of new technologies for learning. The underlying philosophy of this course is "constructionism", which states that people learn better when engaged in making and designing their own computational meaningful projects; therefore, we will become designers of technological tools and curriculum to be used in education and we will become researchers to assess the thinking and learning fostered by the different tools.

COURSE REQUIREMENTS

Readings and class participation (On-going--20% of grade): All students are expected to do the readings, and to participate in discussions in class. When readings are linked from the syllabus, it is strongly suggested that students print them out and have them available in a folder to bring to class.This class involves hands on-learning in real-world settings, therefore students must be present. There is a required text that is available from the Tufts bookstore or in the library: Bers, M (2018) *Coding as a playground: programming and computational thinking and in the early childhood classroom*, Routledge.

Class presentations (On-going--**20% of grade):** Class time will be organized as discussions, not lectures. To help get discussions started, each session a student will be asked to summarize the readings and suggest one question or provocative issue.

Development of a robotics curriculumunit (Drafts Due**March 28**and**April 4—15% of grade):** In small groups students will develop a three-hour curriculum to teach robotics.Later, they will implement their unit in a classroom and will document the learning. They will email both drafts of the curriculum unit (and corresponding assessments) to Kathleen Robinson (Kathleen.robinson@tufts.edu). First Draft due **March 28,**Second Draft due **April 4**

Classroom implementation of a robotics curriculumunit (April 10 and **April 17 - 15% of grade):** In small groups, students will implement their three-hour curriculum to teach robotics.

Final presentation: Documentation of a robotics curriculumunit (April 24—30% of grade): In small groups, students will document the learning experienceand will present their work to the class. The documentation project will include two elements: 1) a short video (less than two

minutes); 2) a PowerPoint or equivalent presentation that tells the story of what happened using text and pictures by focusing on a particular aspect of the experience.

January 23: Introduction and Course Overview

Readings for Class	Koschmann, T. D. (1996). Paradigm shifts and instructional technology: An introduction. In T. D. Koschmann (Ed.), *CSCL: Theory and practice of an emerging paradigm* (pp. 1-24). NJ: Lawrence Erlbaum. Papert, S. (1999, March 29). Papert on Piaget. Time Magazine, special issue on "The Century's Greatest Minds,"105 Stager, G (2016) Seymour Papert
Design Studio	Prof. Bers' presentation Class activity with the four paradigms Papert's video

January30: Coding as a literacy

We will discuss the concept of coding as a literacy of the XXI century and the notion of computational thinking. In class, we will be doing an exercise based on the different parts and chapters of the book.

Readings for Class	Bers, M (2018) *Coding as a playground: programming and computational thinking and in the early childhood classroom*, Routledge. Part I, Chapters 1,2 and 3); Part II Chapters 5, 6 and 7 Vee, A. Understanding computer programming as literacy (http://www.licsjournal.org/OJS/index.php/LiCS/article/view/24/26) Ong, W. "Writing Is A Technology That Restructures Thought" in *The written word* (https://www.scribd.com/document/36156900/Writing-is-a-Technology-That-Restructures-Thought-PDF-by-Walter-J-Ong)
Design Studio	In class exercise based on the different readings

February 6: Dances around the world: Programming robots in Kindergarten (Melissa)

In this session, students will have a hands-on experience with the KIBO robot developed by the DevTech research group.

Readings	Ready for Robotics website

for Class	
Design Studio	Students will work on dancing robots with KIBO, document their dances and post them in the [Early Childhood Robotics Network](#)

February 13: Programming with ScratchJr and computational thinking

Readings for Class	Bers, M.U. & Resnick, M. (2015). *The Official ScratchJr Book.* San Francisco, CA: No Starch Press. https://www.nostarch.com/scratchjr *INTRODUCTION:* https://www.nostarch.com/download/samples/OfficialScratchJrBook_sampleIntroandCh1.pdf Wing, J (2006) "Computational Thinking" (http://www.cs.cmu.edu/~wing/publications/Wing06.pdf) "Computational Thinking: I Do Not Think It Means What You Think It Means" by Lorena Barba (https://medium.com/@lorenaabarba/computational-thinking-i-do-not-think-it-means-what-you-think-it-means-6d39e854fa90#.rzgc28lbn) "A Different Approach to Coding" by Mitch Resnick and David Siegel (https://brightthemag.com/a-different-approach-to-coding-d679b06d83a) [Scratch Jr. website](#)
Design Studio	In class we will make ScratchJr. projects

February 20: Powerful Ideas from Computer Science

Design Studio	Students will choose at least two powerful ideas of Computer Science described in Prof. Bers book (chapter 6) and will develop a KIBO dances curriculum unit to teach it.
Readings for Class	[MA Digital literacy curriculum standards](#) K2 CS frameworks:https://k12cs.org/pre-k/

February 27: Visit to classroom I (EPCS): KIBO dances

Design Studio	Robotic project in the school

March 6: Visit to classroom II (EPCS): KIBOdances

Design Studio	Robotic project in the school

March 13: Computational thinking and technological fluency

Readings for Class	[2016 Massachusetts Science and Technology/Engineering Curriculum Framework](#) and [2016 Massachusetts Digital Literacy and Computer Science (DLCS) Curriculum Framework](#) Technically Speaking: Why all Americans Need to Know More about Technology https://www.nap.edu/read/10250/chapter/1#1 National Academy of Engineering and National Research Council, 2002 K-12 Computer Science Frameworks (https://k12cs.org/wp-content/uploads/2016/09/K%E2%80%9312-Computer-Science-Framework.pdf)
Design Studio	Discussing frameworks and spiral exercise about the Powerful ideas

March 20: Spring break

March 27: Curriculum and Assessment development- On**March 28**, you will submit first draft (email curriculum and assessments to Kathleen.Robinson@tufts.edu).

Design Studio	Students will work in groups developing their curriculum projects and assessments
Readings for class	[Curriculum templates](#)

April 3: Curriculum testing- On **April 4**, you will submit second draft (email curriculum and assessments to Kathleen.Robinson@tufts.edu).

Design Studio	Students will work in groups testing their curriculum projects and assessments with each other

April 10: Visit to Classroom I (Kindergarten at JCDS): Curriculum implementation

Design studio	Robotics project

April 17: Visit to Classroom II (Kindergarten at JCDS): Curriculum implementation (Melissa)

Design studio	Group activity

April 24: Final presentations of robotic projects

Assignment due	Final video and PowerPoint (or equivalent) presentations