Inter American University of Puerto Rico
Metropolitan Campus
Faculty of science and technology
Department of Computer Science and Mathematics
Graduate Program in Educational Computing

I. GENERAL INFORMATION

Course Title	:	Computational Thinking and Standards
Code and Number	:	ECMP 5100
Credits	:	3
Academic term	:	
Teacher	:	
Business hours	:	
Office telephone	:	
Email	:	

II. DESCRIPTION

Study of the principles of computational thinking and different related standards. Discussion of strategies for their implementation in the K-12 curriculum. Development of computational and creative thinking through exploration with the Scratch tool. Requires additional hours in a virtual open lab

III. COMPETENCES

In this course, competences 1, 3 and 5 of the profile of the graduate of the Program, namely:

1. Demonstrate knowledge and understanding of the fundamentals of computer science for teaching at various educational levels.

3. Develop algorithms for solving problems and code them in a high-level programming language.

5. Promote ethics in the study of computer science as a professional alternative that allows establishing equity in the various social groups at various educational levels.

IV. OBJECTIVES

Upon completion of this course the student will be able to:

1. Discuss the historical background and technological changes
2. Discuss standards of computational thinking in the implementation of the use of Computer Science in levels K-12
3. Explain the strategies for the development of computational thinking.
4. Apply program execution and debugging skills by using the Scratch tool.

5. Apply techniques to modularize the logic of a program by using the Scratch tool.
6. Promote a positive attitude towards ethical values towards the study of Computer Science.

V. CONTENT

A. Historical development and future trends in educational computing
B. Definition of computational or computer thinking
C. Computational Thinking Standards
    1. Creativity and innovation
    2. Critical Thinking and Problem Solving
    3. Communication and collaboration technology
    4. Information and media literature
    5. Productivity and *Accountability*
    6. Leadership, Flexibility and Adaptation
D. Using Scratch to Encourage Creativity in Computational Thinking
    1. Preparation of the technological infrastructure for the use of Scratch
    2. Computational concepts of sequence and repetition
    3. Computational concepts of parallelism and event
    4. Computational concepts of conditions, operators and data
    5. Computational experimentation and iteration practices
    6. Computational testing and debugging practices
    7. Computational practices of reuse and remixing
    8. Computational practices of abstracting and modularizing
    9. Example projects and experiences
E. Computer stereotypes and technology myths at work
    1. STEM careers (Science, Technology, Engineering and Mathematics).
    2. Related to gender and ethnicity.

VI. ACTIVITIES

Short exercises will be assigned periodically in a practical way with the use of the computer. The short exercises will keep the students active during the course.
1 midterm exam and 1 final exam will be offered
1 project-type programs with a greater magnitude of complexity will be assigned. It is recommended to work the programs in pairs, and they have a deadline for delivery.

VII. EVALUATION

Criterion	Percentage	Punctuation
Project	33%	100
Midterm exam	33%	100
Final exam	34%	100
Total	**100%**	**300**

VIII. SPECIAL NOTES

1. Remember that any course assignment must comply with the General Student Student Regulations, Chapter V, Article 1, Section B.2 which establishes "Plagiarism, dishonesty, fraud, manipulation or falsification of data and any other Inappropriate behavior related to academic work is contrary to institutional principles and norms and is subject to disciplinary sanctions. "

2. All students who require auxiliary services or special assistance must request them at the beginning of the course or as soon as they become aware that they need them, through the corresponding registration in the office of the Professional Counselor José Rodríguez, Coordinator of Services to students with Disabilities, located in the University Orientation Program.

3. Use of electronic devices.

   Cell phones and any other electronic device that could interrupt the teaching and learning processes or alter the environment conducive to academic excellence will be disabled. Urgent situations will be addressed, as appropriate. The handling of electronic devices that allow accessing, storing or sending data during evaluations or exams is prohibited.

4. Compliance with the provisions of Title IX

   The Federal Higher Education Law, as amended, prohibits discrimination on the basis of sex in any academic, educational, extracurricular, athletic activity or in any other program or employment, sponsored or controlled by an institution of higher education regardless of whether it is carried out. inside or outside the institution's premises, if the institution receives federal funds.

   In accordance with current federal regulations, our academic unit has appointed an Assistant Title IX Coordinator who will provide assistance and guidance in relation to any alleged incident that constitutes discrimination based on sex or gender, sexual harassment or sexual assault. . You can contact the Assistant Coordinator, George Rivera, Director of Security, at 787-250-1912, extension 2147, or by email grivera@metro.inter.edu .

   The Normative Document entitled Norms and Procedures for Attending Alleged Violations of the Provisions of Title IX is the document that contains the institutional rules to channel any complaint that is presented based on this type of allegation. This document is available on the website of the Inter American University of Puerto Rico (www.inter.edu).

IX. EDUCATIONAL RESOURCES

A. Electronic filings [available at http://inter.blackboard.com]
B. Computer and Internet access
C. Reference book (s)
D. Scratch

X. BIBLIOGRAPHY

Kong, S.- C. and Abelson, H. [Editors] (2019). Computational Thinking Education. Springer Open. ISBN 978-981-13-6527-0 / I SBN 978-981-13-6528-7 (e-book)

Wainewright , M. (2019). 25 Scratch 3 Games for Kids: A Playful Guide to Coding. Not Starch Press. EAN / UPC 9781593279905

Woodcock, J. (2019). Coding Games in Scratch: A Step-by-Step Visual Guide to Building Your Own Computer Games (Computer Coding for Kids). ISBN 978-1-4654-7733-0

Massachusetts Institute of Technology http://scratch.mit.edu

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