

ISC 1057 Syllabus

Computational Thinking

Fall 2016

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Class: TR 2-3:15 p.m.
Location: 217 HCB
Texts: *9 Algorithms That Changed The Future: The Ingenious Ideas That Drive Today's Computers*
John MacCormick, Princeton University Press, 2012;
Paperback ISBN 978-0-691-15819-8; cost < \$15

Essays by Brian Hayes, downloadable from the
website <http://www.americanscientist.org/authors/detail/brian-hayes>

Course Description. It is clear that computers can almost imitate human-like intelligence. The evidence of this is everywhere around us: movie, book and music recommendation systems; programs that allow us to experiment on models of the earth; medical imaging software that can detect tumors that humans can't see. This course asks how computers have gained this ability. The answer includes our detecting patterns in nature, but also patterns in the very way we think. This course will present popular computational methods shaping our lives, and try to explain the ideas that make them work. Students will practice logical thinking by working with versions of these computational methods that affect society and science. Knowledge of a computer programming language is not required nor will it be taught.

Topics Covered. We begin this course by looking at what we mean by computational thinking. We explore some ideas that make computing complicated tasks possible as well as seeing what types of problems are amenable to being solved on the computer. We explore the logic behind existing computational approaches for problems which we use daily; in all cases we try to understanding the logic by looking at simplified examples.

Course Objectives. By the end of this course, students will demonstrate the ability to:

- analyze problems drawn from real-world scenarios by interpreting and evaluating data and applying appropriate mathematical, statistical, logical, and/or computational models or principles, using appropriate technology, and explaining the results;

- use computational thinking to frame questions, look at different ways to solve problems, and determine what insight can be gained;
- demonstrate how computations can be viewed as an alternative to theory and experiments in scientific research;
- identify concepts that make computing complicated tasks possible;
- explain some of the logic behind existing computational approaches for various problems of interest to science and society.

Final Grade Determination. Your grade for the course will be determined by class participation, homework and group projects. The distribution of grading for the course is:

- Class Participation - 10%
- In-class Quizzes - 25%
- Homework - 40%
- Projects - 25%

The in-class quizzes will be taken using the app **Socrative** which you will access through your smart phone. Quizzes will be given almost daily and are typically given at the end of each lecture. The class participation portion of your final grade will be determined by the percent of quizzes that you attempt. Your score on the quiz does not affect the class participation grade; essentially we are using the quiz to count for attendance. Also during many of the lectures you will be asked to take **Practice Quizzes** which help you and the instructor assess whether you understand the material; these do NOT count towards your grade but are for your benefit. Assigned homework must be done individually and submitted by the due date unless you are using your late homework days. **You will have a total of 7 late homework days throughout the semester** unless extenuating circumstances arise. Homework assignments consist of problems similar to the examples discussed in the lecture and assist the student in understanding the material. Projects are much more involved than homework assignments and serve to enhance or expand on the material covered in class. Consequently, students will be expected to work on the project over a longer span of time – typically 3 to 4 weeks. Two group projects will be assigned during the semester. The projects will require a substantial amount of internet research and writing. For each project, several choices of topics will be suggested to accommodate the varied interests of students.

Liberal Studies for the 21st Century Program at Florida State University builds an educational foundation that will enable FSU graduates to thrive both intellectually and materially and to support themselves, their families, and their communities through a broad and critical engagement with the world in which they live and work. Liberal Studies offers a transformative experience; this course has been approved as meeting the Liberal Studies requirements and thus is designed to help you become a critical analyzer of quantitative and logical claims. **In order to fulfill the State of Florida’s College mathematics and computation requirement the student must earn a “C” or better in the course.**

University Attendance Policy. Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Academic Honor Policy. The Florida State University Academic Honor Policy outlines the University’s expectations for the integrity of students academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to . . . be honest and truthful and . . . [to] strive for personal and institutional integrity at Florida State University.

(Florida State University Academic Honor Policy, found at <http://fda.fsu.edu/Academics/Academic-Honor-Policy>.)

Americans With Disabilities Act. Students with disabilities needing academic accommodation should:

1. register with and provide documentation to the Student Disability Resource Center; and
 2. bring a letter to the instructor indicating the need for accommodation and what type. This should be done during the first week of class.
- Please note that instructors may be asked to collect and report data on student learning outcomes for the Liberal Studies competency for SACS accreditation purposes.
 - This syllabus and other class materials are available in alternative format upon request.
 - For more information about services available to FSU students with disabilities, contact the:

Student Disability Resource Center

874 Traditions Way

108 Student Services Building

Florida State University

Tallahassee, FL 32306-4167

(850) 644-9566 (voice)

(850) 644-8504 (TDD)

sdrc@admin.fsu.edu

<http://www.disabilitycenter.fsu.edu/>

Free Tutoring from FSU On-campus tutoring and writing assistance is available for many courses at Florida State University. For more information, visit the Academic Center for Excellence (ACE) Tutoring Services' comprehensive list of on-campus tutoring options - see <http://ace.fsu.edu/tutoring> or contact tutor@fsu.edu. High-quality tutoring is available by appointment and on a walk-in basis. These services are offered by tutors trained to encourage the highest level of individual academic success while upholding personal academic integrity.

Syllabus Change Policy "Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice."
