



CIS 4930 Top Ten

Course Syllabus

## The Top Ten Algorithms of the Last 100 Years

This course will explore the Top Ten Algorithms of the last 100 years. This collection of algorithms will be obtained from official listings of the Top Ten Algorithms from the 20th Century, modified slightly by considering 21st century achievements, and modified again to keep the overlap between this course and the typical coverage of COP 4531 (Analysis of Algorithms) acceptably small. While subject to these influences, the top ten list is certain to contain 10 interesting and influential algorithms representing a broadly diverse collection of applications.

**Pre-Requisite:** COP 4530 or equivalent

Note that this class is suitable for students in the BS program prior to OR after taking COP 4531 (Algorithms) as well as students in the BA program who want to know more about what is arguably the most central core subject of Computer Science.

For each algorithm in our list, we will proceed along this exploratory path:

1. Background - overview of the scientific/engineering environment in which the algorithm is applied
2. Core
  - i. Precise description of algorithm body or recipe for computation
  - ii. Assumptions
  - iii. Conclusions
  - iv. Runtime and Runspace
3. Variations and Spinoffs
4. Impact - scientific and economic
5. History - discovery and subsequent development of the algorithm and its principal applications

**Course Grading:** This will be considered a "project course" and as such will have one in-term exam at about the 10th week. A project or paper, with accompanying presentation, will substitute for a final exam. The total course grade will be obtained as follows (with possible minor changes):

In-Term Exams (2)	40
Paper or Project	20
Presentation	20
Class Participation	20

See the Course Calendar for details on exam scheduling and due dates for deliverables.

**Delivery Modes:** This class will have students attending in two distinct modes:

- Traditional On-Campus meets on Panama City Campus
- Distance Learning On-Line

The content, objectives, assignments, assessments, and grading are the same for all students. Obviously, however, on-campus and distance students sometimes participate in different ways.

**Class Participation:** Students will participate in a series of graded discussion forums in the Blackboard course site. These forums will cover topics in the required reading and may also require the student to do some experimental programming. This is the primary medium for class interaction for all students.

The on-campus group will meet on some (but not all) weeks to go over the required reading material. Notes from these sessions will be posted in Blackboard for all students to access.

**Instructor:** R C Lacher (Contact info and office schedule TBA)

### **Course Objectives:**

At the end of this course, the student should be able to accomplish the following, for each algorithm studied in the course:

- Precisely describe the computational body of the algorithm
- State and give an informal argument for the asymptotic runtime and runspace of the algorithm
- Describe the scientific environment within which the algorithm functions
- Describe the issues involved in proving correctness of the algorithm
- Describe the scientific and economic impact of the algorithm
- Provide a brief history of the discovery and subsequent development of the algorithm

In addition the student should be able to describe the importance of the study of algorithms in general, in terms of scientific and economic advancement.

### **Course Materials:**

The student should have one of the following texts:

- Cormen, T.H.; Leiserson, C.E; Rivest, R.L.; and Stein, C. (2009). *Introduction to Algorithms* (3<sup>rd</sup> ed.). MIT Press, Cambridge, MA. ISBN 978-0-262-03384-8
- Sedgewick, Robert and Wayne, Kevin (2011). [\*Algorithms \[Java\], 4th Edition\*](#), Pearson, ISBN 0-321-57351-X

- Sedgewick, Robert (2001). [\*Algorithms \[C++\], Parts 1-5, 3rd Edition\*](#), Pearson, ISBN 0-201-72684-X

Additional materials on the specific algorithms covered in the class will be released via the course calendar.

## **COURSE POLICIES:**

**First Day Attendance Policy:** Official university policy is that any student not attending the first class meeting will be automatically dropped from the class. For distance students, this policy is interpreted as answering "True" to the First Day Attendance Quiz in the Blackboard site.

**Regular Attendance Policy:** The university requires attendance in all classes. Attendance in distance classes shall mean regular access to the course web site via `campus.fsu.edu` and regular participation in the class discussion forums. Here, "regular" shall mean a substantial amount of time on a weekly basis. Note that individual access statistics are maintained by Blackboard.

Excused absences include documented illness, deaths in the immediate family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. Accommodations for these excused absences will be made and will do so in a way that does not penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

**Proctored Exam Policy:** All exams must be proctored and taken at an approved testing site during the exam window. It is the student's responsibility to arrange for proctored exams in compliance with the FSU standards. Go to <http://learningforlife.fsu.edu/cat/test/distancelearning/students.cfm> for complete information on setting up a proctored exam site.

**Exam Makeup Policy:** An exam missed without an acceptable excuse will be recorded as a grade of zero (0). The following are the only acceptable excuses:

- If submitted *prior to* the day of the scheduled exam:
  - A written and signed explanation as to why the exam will be missed. Illness or required professional travel are acceptable, while discretionary or personal travel are not. In any case the explanation should be accompanied by corroborating documentation, including names and contact information, and the explanation must be accepted by the instructor prior to missing the exam.
  - Evidence from a university official that you will miss the exam due to university sanctioned travel or extracurricular activity.
- If submitted *on or after* the day of the scheduled exam:

- A note from a physician, university dean, spouse, parent, or yourself indicating an illness or other extraordinary circumstance that prevented you from taking the exam and could not be planned for in advance. Again, corroborating information should be supplied.

All excuses must be submitted in writing, must be signed by the excusing authority, and must include complete contact information for the authority, including telephone numbers and address.

Missed exams with acceptable excuse will be made up or assigned the average grade of all other exams, at the option of the course instructor.

Missed, and acceptably excused, final exams will result in the course grade of 'I' and must be made up in the first two weeks of the following semester.

**Grade of 'I' Policy:** The grade of 'I' will be assigned only under the following exceptional circumstances:

- The final exam is missed with an accepted excuse for the absence. In this case, the final exam must be made up during the first two weeks of the following semester.
- Due to an extended illness or other extraordinary circumstance, with appropriate documentation, the student is unable to participate in class for an extended period. In this case, arrangements must be made to make up the missed portion of the course prior to the end of the next semester.

**Completion of Work Policy:** To be eligible for the grade of A or A-, passing versions of all assignments must be submitted.

### **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://dof.fsu.edu/honorpolicy.htm>.)

All students are expected to uphold the Academic Honor Policy. Please note the following items are defined and made violations by the policy:

1. Plagiarism
2. Cheating
3. Unauthorized Group Work

4. Fabrication, Falsification, and Misrepresentation
5. Multiple Submission
6. Abuse of Academic Materials
7. Complicity in Academic Dishonesty
8. Attempted ...

Violations of the academic honor policy may result in failing grades and/or dismissal from the university. All students are expected to read and understand the policy.

**Checking for Plagiarism:** FSU subscribes several databases of papers and computer source code that have been previously published or turned in for credit in university courses worldwide. Student work may be checked in one or more of these databases for originality. Note that turning in work that contains uncited quoted material from any source is considered plagiarism and a violation of the FSU honor code.

#### **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.

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/>

(This syllabus and other class materials are available in alternative format upon request.)

## **EMERGENCY MANAGEMENT INFORMATION:**

Information regarding the status of FSU in an emergency situation may be obtained from the following sources:

- For information specific to the Panama City Campus go to the FSUPC web page at <http://www.pc.fsu.edu/> or call the Campus Hotline number 850-770-2000
- For information related to FSU in general and the Tallahassee Campus go to the FSU alerts web page at <http://www.fsu.edu/~alerts/>
- For state-wide and national information, go to the Florida Division of Emergency Management information pages at <http://www.floridadisaster.org/>

Any specific information related to this class will be posted on the course web site or sent via email to your fsu email address.

## **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. Such notice will be in the form of a posting to the course web site on [campus.fsu.edu](http://campus.fsu.edu).