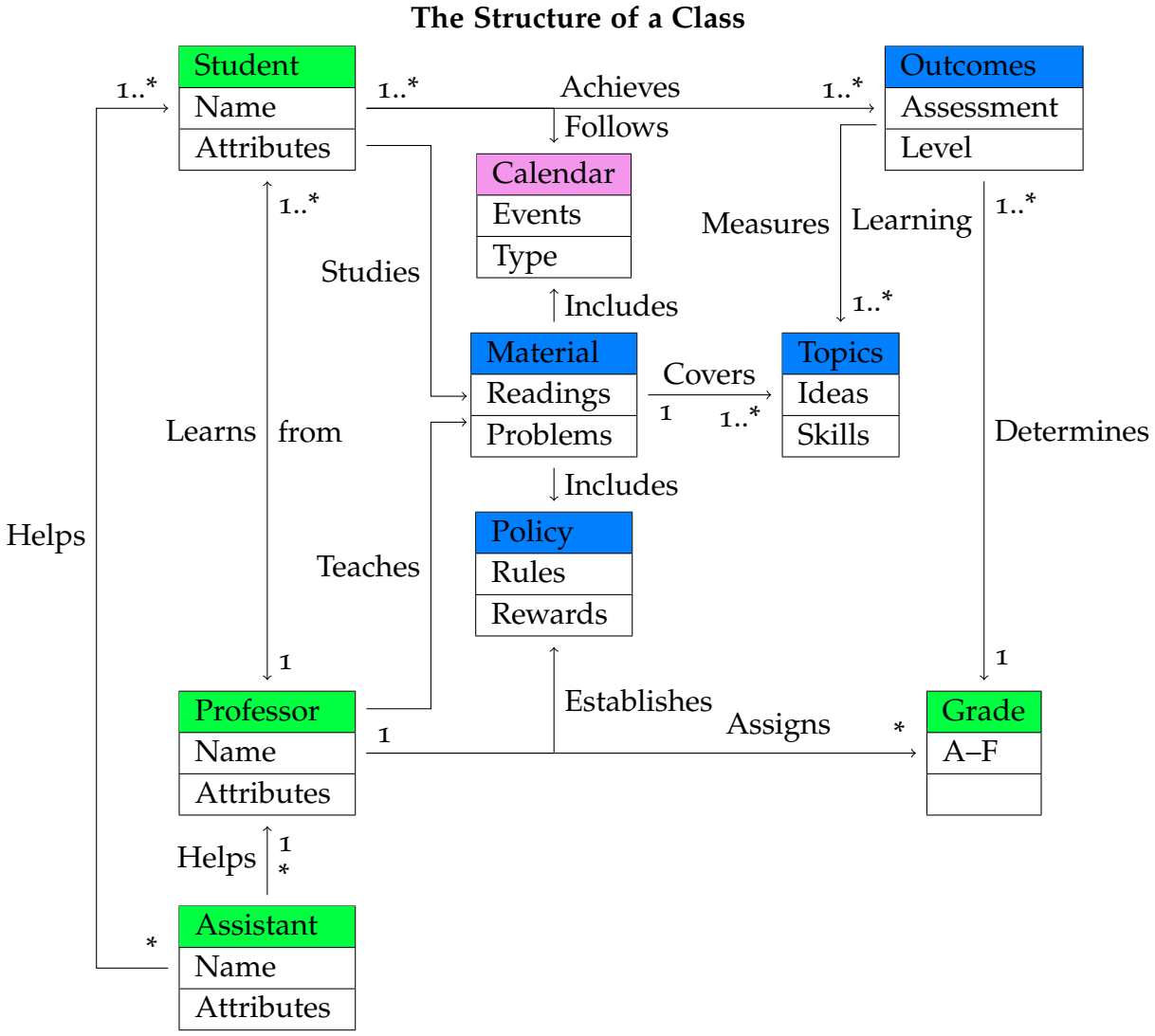
Class Syllabus

CSE 5211 Analysis of Algorithms

School of Computing

Florida Tech

Spring 2018 (January 10, 2018)



Course Schedule

CRN	Course Number/Section	Title	Days	Times	Place
24674	CSE 5211/01	Analysis of Algorithms	MWF	13:00-13:50	Crawford 210

January

~~1~~	~~2~~	~~3~~	~~4~~	~~5~~	~~6~~	~~7~~
~~8~~	~~9~~	~~10~~	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

February

			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

March

			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

April

						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

May

1	2	3	4	5	6

Course Description

CSE 5211 Analysis of Algorithms (Credit Hours: 3) Presents time and space complexity of computer algorithms. Includes algorithm classes, such as divide-and-conquer, greedy, dynamic programming and backtracking; techniques for solving recurrence equations; graph algorithms; searching and sorting; and deterministic and non-deterministic polynomial time problem classes. Recommended: Background knowledge equivalent to CSE 2010 and MTH 1002

Prerequisites by Topic

Algorithmic paradigms, efficiency measures, rates of growth and asymptotic behavior, graph theory, recursion, data structures, and discrete mathematics.

Students, Professor & Assistants

Students

Get to know your fellow classmates. Help each other.

The Professor


William David Shoaff

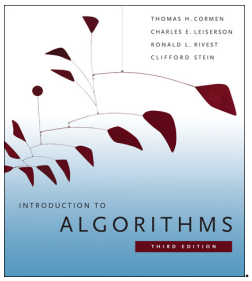

Room 324, Harris Center for Science and Engineering


wds@cs.fit.edu


(321) 674-8066


MWF 9:30 – 10:45 or by appointment, walk-ins welcome

Assistant



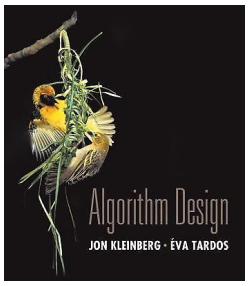
Calendar

A detailed course calendar is here. An short calendar of key dates is on the course management system. Florida Tech's Spring calendar can be accessed here.

Material

- The course management system stores the syllabus, class notes, the textbook (Corman et al., 2009), project descriptions, grades, and other material.
- My URL for the class is

  http://cs.fit.edu/~wds/classes/aa



- Slides tied to the (Kleinberg and Tardos, 2006) text can be found online.
- There are many excellent sources on algorithms, (Bentley, 1982, 1986, 1988; Graham et al., 1989; Knuth, 1997a,b, 1998).

Policy

Attendance

The class meets on Monday, Wednesday and Friday from 1:00 to 1:45. The location is Crawford 210. Attendance is required. If, for some reason [1], you cannot attend class inform your professor as soon as possible. Written documentation is necessary for an absence to be excused.

Rules for quizzes and exams

1. In-class: No notes, books, conversations, peeking at a neighbor's answers, note-passing, sign language, mechanical/electrical devices: abacus, camera, telephone, calculator, etc. First-time violators of the rule will receive a 0 for the test. Second-time violators of the rule will receive an F for the course.
2. Take-home: Provide attributions to your sources. Do not turn in answer you do not understand.

Rules for homework

1. You are encouraged to work with others.
2. Ask for guidance instead.

Academic integrity

The Patsy Mink Equal Opportunity in Education Act, aka Title IX:

What is Title IX?

Title IX of the Educational Amendments Act of 1972 is the federal law prohibiting discrimination based on sex under any education program and/or activity operated by an institution receiving and/or benefiting from federal financial assistance.

Behaviors that can be considered "sexual discrimination" include sexual assault, sexual harassment, stalking, relationship abuse (dating violence and domestic violence), sexual misconduct, and gender discrimination. You are encouraged to report these behaviors.

Reporting

Florida Tech can better support students in trouble if we know about what is happening. Reporting also helps us to identify patterns that might arise – for example, if more than one complainant reports having been assaulted or harassed by the same individual.

Florida Tech is committed to providing a safe and positive learning experience. To report a violation of sexual misconduct or gender discrimination, please contact Security at 321-674-8111. *** Please note that as your professor, I am required to report any incidences to Security or to the Title IX Coordinator (321-674-8700).** *For confidential reporting, please contact CAPS at 321-674-8050.*

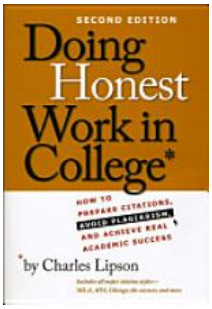
[1] Religious holiday, illness or accident, family emergency, . . .

The department enforces an honor code. This honor code establishes a recommended penalty and reporting structure for academic dishonesty.

Offense	Recommended Penalty	Report to
First	Zero on work	Dean of Students
Second	F in course	Dean of Students
Third	Expulsion from Program	UDC

Florida Tech provides guidelines to help students understand plagiarism, its consequences, and how to recognize and avoid academic dishonesty. Lipson describes three principles for academic integrity (Lipson, 2004).

1. "When you said you did it, you actually did."
2. "When you use someone else's work you cite it, When you use their word, you quote it openly and accurately."
3. "When you present research materials, you present them fairly and truthfully. That's true whether the research involves data, documents, or the writing of other scholars."



Issues and Concerns

1. If you have a disability, inform your teacher. Accommodations can be provided.
2. If you have an academic problem, your teacher can link you to support services.
3. If you have a personal issue, without revealing private information, your teacher can link you to support services.
4. No forms of discrimination or harassment will be tolerated.

Don't fail in silence!

Richard Ford's advice to new students, The Florida Tech Crimson, Fall 2011, Issue 2

Where to Get Help

1. Your professors (For this class: MWF 9:30 to 10:45 or by appointment)
2. Your academic advisor
3. Your teaching assistants
4. The Computer Sciences Help Desk
5. The Academic Support Center
6. Counseling and Psychological Services

Topics

1. Mathematics for Algorithm Analysis
2. Divide and conquer
3. Dynamic programming
4. Greedy algorithms
5. Graph algorithms
6. Complexity theory

The emphasis is on algorithmic problem-solving. Algorithmic efficiency, elegance, and generality are quality characteristics.

Outcomes

By the end of the course, each student will be able to:

1. Design and analyze algorithms. (1: Fundamental knowledge)
2. Find algorithmic solutions to computational problems. (2: Scientific, computing, and engineering problem solving)
3. Design space-time efficient algorithms. (4: Trade-offs in design choices)
4. Analyze through experimention algorithms they have programmed. (2: Scientific, computing, and engineering problem solving and 3: Skillful software construction)
5. Skillfully present their work to peers. (5: Communicate effectively)
6. Work on a small team to complete a project. (6: Effective teamwork)

1. An ability to apply knowledge of mathematics, science, computing, and software engineering
2. An ability to identify computing and engineering problems, identify and define the requirements, design and conduct experiments, analyze and interpret data appropriate to solving these problems
3. Achievement of skills necessary to construct complex software systems
4. Comprehension of the trade-offs involved in design choices
5. An ability to communicate effectively with a range of audiences
6. An ability to function effectively on multidisciplinary teams to accomplish a common goal

Grades

Your final grade will be based on your performance on quizzes and projects. Projects will be submitted electronically using the submit server.

Grades and their relation to performance

Grade	A	B	C	D	F
Performance	Excellent	Good	Average	Poor	Failure

Student performance is measured in the following ways.

1. One individual project (25% of grade)
2. Team project (25% of grade)

3. Midterm examination (25% of grade)
4. Final examination (25% of grade)

Your score S will be a number between 0 and 100 computed by the formula

$$S = \frac{25}{100} \sum (\text{individual project} + \text{team project} + \text{midterm} + \text{final})$$

Final letter grades will be assigned based on the range in which your score S falls:

$$(90 \leq S \leq 100) \Rightarrow \texttt{A}, \quad (80 \leq S \leq 89) \Rightarrow \texttt{B}, \quad (70 \leq S \leq 79) \Rightarrow \texttt{C}, \quad (60 \leq S \leq 69) \Rightarrow \texttt{D}, \quad (0 \leq S \leq 59) \Rightarrow \texttt{F}$$

The last day to withdraw for the class with a final grade of `W` is Friday, March 17.

Checking Grades

Check you grades on the course management system. Contact your professor when you find an error in your recorded grades. Be able to document the error.

Measure of Success

The target achievement levels for the class are:

- 70% of students will score at or above average (70%) on the final comprehensive examination. The questions on the final measure attainment of course outcomes.
- 80% of students will rate their teammates as good to excellent as measured by a rubric completed by teammates.
- 80% of students will be rated as good to excellent communicators as measured by a rubric completed classmates and the instructor.

References

Bentley, J. L. (1982). Writing Efficient Programs. Prentice-Hall. [page 3]

Bentley, J. L. (1986). Programming Pearls. Addison-Wesley. [page 3]

Bentley, J. L. (1988). More Programming Pearls: Confessions of a Coder. Addison-Wesley. [page 3]

Corman, T. H., Leiserson, C. E., Rivest, R. L., and Stein, C. (2009). Introduction to Algorithms. MIT Press, third edition. [page 3]

Graham, R. L., Knuth, D. E., and Patashnik, O. (1989). Concrete Mathematics. Addison-Wesley. [page 3]

Kleinberg, J. and Tardos, E. (2006). Algorithm Design. Pearson. [page 3]

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Knuth, D. E. (1997b). The Art of Computer Programming, Volume 2 (3rd Ed.): Seminumerical Algorithms. Addison-Wesley Longman Publishing Co., Inc., Boston, MA, USA. [page 3]

Knuth, D. E. (1998). The Art of Computer Programming, Volume 3: (2nd Ed.) Sorting and Searching. Addison Wesley Longman Publishing Co., Inc., Redwood City, CA, USA. [page 3]

Lipson, C. (2004). Doing Honest Work in College: How to Prepare Citations, Avoid Plagiarism, and Achieve Real Academic Success. University of Chicago Press, Chicago. [page 4]