SYLLABUS CSC 505 FALL 2015 (3 CREDIT HOURS)
DESIGN AND ANALYSIS OF ALGORITHMS

When & Where:

- section 001: MW 12:50-2:05 PM, EB1 room 01011
- section 002: MW 5:20-6:35 PM, EB3 room 02213
- section 601: online

COURSE DESCRIPTION

This course provides an introduction to

- Performance analysis of algorithms: asymptotic bounds for worst case, best case, average case, NP-completeness.
- Algorithms and data structures for classical problems such as sorting, searching, graph problems, etc.
- Algorithm design techniques, for example recurrence, divide and conquer, dynamic programming, greedy algorithms.

This is an approximate list. We will introduce additional topics as warranted by student interest and time; we will omit topics as time expires. Please check out our tentative schedule (subject to change).

PREREQUISITES

The class has the following prerequisites:

- calculus and lower level math,
- discrete mathematics, for example CSC 224/226, or a comparable course,
- data structures, for example CSC 314/316, or a comparable course,
- basic programming skills.

LEARNING OUTCOMES

You will learn how to solve computational problems using concepts of algorithms and discrete mathematics, e.g.

- how to rigorously analyze correctness, time, and space usage of algorithms,
- when and how to use fundamental algorithms and data structures, and
- how to apply algorithm design strategies such as recursion, divide-and-conquer, dynamic programming.
TEXTBOOK (REQUIRED)

*Introduction to Algorithms* by TH Cormen, CE Leiserson, RL Rivest, and C Stein.
Web Link: https://mitpress.mit.edu/books/introduction-algorithms

The textbook is required.

INSTRUCTOR

Steffen Heber
Email: sheber@ncsu.edu
Phone: 919-513-1118
Office Location: 2260 EB2
Office Hours: Tuesday 2-3 PM (on campus), Thursday 2-3 PM (online)

Teaching Assistants TBA

COURSE STRUCTURE AND POLICIES

The coursework consists of lectures, readings, homework assignments, and exams.

- Lectures might depart from our textbook. Some material presented in class might not be available through the lecture notes, or textbook. You are responsible for all material presented or discussed in class.

- Class attendance is mandatory. For complete attendance and excused absence policies, please see http://policies.ncsu.edu/regulation/reg-02-20-03.

- No laptops or cell phones are allowed during class.
- Readings will generally be taken from our textbook with possible supplements from the literature.

- We will have multiple un-announced in-class quizzes (only for the students in sections 001 and 002), two midterms, and a final exam.

- All exams are closed book exams. However, calculators (not programmable!) are permitted. Sorry, no cell phones are allowed.

- Exams might include material from lectures, assignments, and readings. All exams are closed book exams.

- There will be four homework assignments. All homework assignments are intended to be individual work.
**ELECTRONICALLY-HOSTED COURSE COMPONENTS**

Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like email or web-postings, where relevant to the course. Examples include online discussions of class topics, and posting of student coursework. All students are expected to respect the privacy of each other by not sharing or using such information outside the course.

**Electronically-hosted Components:** Web site at Wolfware classic, contains information about syllabus, and tentative timeline. We will be using Piazza for class discussion. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza. The system is highly catered to getting you help fast and efficiently from classmates, the TA, and myself. If you have any problems or feedback for the developers, email team@piazza.com. Find our class page at: https://piazza.com/ncsu/fall2015/csc505/home. Disclaimer: Do not post homework solutions - this will be considered as cheating. For questions about personal grades or requests for meetings please contact the instructor, or the TAs. If you want to send a completely anonymous message, please use the Wolfware feedback tool. Keep in mind that we cannot reply to these messages, so if you want a response please contact us directly.

**GRADING**

Grades will be computed with a weighted average using the weights shown below.

<table>
<thead>
<tr>
<th></th>
<th>Sections 001, 002</th>
<th>Section 601</th>
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</thead>
<tbody>
<tr>
<td>final exam</td>
<td>30%</td>
<td>40%</td>
</tr>
<tr>
<td>two midterm exams (equal weights)</td>
<td>30%</td>
<td>40%</td>
</tr>
<tr>
<td>multiple unannounced quizzes</td>
<td>20%</td>
<td>0%</td>
</tr>
<tr>
<td>Four homework assignments</td>
<td>20%</td>
<td>20%</td>
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</tbody>
</table>

This Course uses Standard NCSU Letter Grading.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A+</td>
<td>97 ≤ ≤ 100</td>
</tr>
<tr>
<td>A</td>
<td>93 ≤ ≤ 97</td>
</tr>
<tr>
<td>A-</td>
<td>90 ≤ ≤ 93</td>
</tr>
<tr>
<td>B+</td>
<td>87 ≤ ≤ 90</td>
</tr>
<tr>
<td>B</td>
<td>83 ≤ ≤ 87</td>
</tr>
<tr>
<td>B-</td>
<td>80 ≤ ≤ 83</td>
</tr>
<tr>
<td>C+</td>
<td>77 ≤ ≤ 80</td>
</tr>
</tbody>
</table>
Course grades may be curved up, but they will never be curved down.

There is a one-week time limit for submission of disputes for exams and assignments. The entire exam or homework may be re-graded, and not just the disputed question.

There are no makeup exams. If you are forced to miss a exam, you have to contact the instructor before the exam, and a university accepted excuse must be presented. If the excuse is accepted, the score of your final exam will be used to replace the grade of the missed exam. The score of a missed quiz will automatically be replaced by your final exam score, no excuse is required.

Bad Quiz Forgiveness Policy (applies only to students in sections 001 and 002): every quiz score that is lower than your score in the final exam will be replaced by the final exam score.

Bad Midterm Forgiveness Policy (applies only to students in section 601): one midterm score that is lower than your score in the final exam will be replaced by the final exam score.

Extra credit: there might be extra points in homeworks and exams. The bonus points earned in a particular homework/exam cannot be transferred to other assignments or exams.

**HOMEWORK POLICIES**

All homework assignments are intended to be individual work. Turning in an exam, or assignment which is not the student’s own work is cheating. Copying of text, code, or other content from the Internet (or other sources) is plagiarism. Any tool/resource must be approved in advance by the instructor and identified and acknowledged clearly in any work turned in, anything else is plagiarism. For more information, please consult the university’s Code of Student Conduct.

Homework assignments must be submitted in printed form via the Wolfware submit mechanism before the announced deadline. To avoid reduced marks, please submit word/latex-formatted PDF file, NOT scanned writing in pdf format. Scanned writing is hard to read, takes longer to grade, and produces gigantic files. Use "UnityID_HW#" as a name of pdf file, where # should be replaced by current homework number; write your name and unity ID at the top of your homework on page one. Please try this out well before the due date to make sure that it works for you.
• **Late Policy:** All assignments are due on **9 PM** of the due date. Late submission will result in a 10%/40% point reduction on the first/second day after the due date. No credit will be given for submissions that are three or more days late.

**POLICIES ON INCOMPLETE GRADES**

If an extended deadline is not authorized by the Graduate School, an unfinished incomplete grade will automatically change to an F after either (a) the end of the next regular semester in which the student is enrolled (not including summer sessions), or (b) by the end of 12 months if the student is not enrolled, whichever is shorter. Incompletes that change to F will count as an attempted course on transcripts. The burden of fulfilling an incomplete grade is the responsibility of the student. The university policy on incomplete grades is located at http://policies.ncsu.edu/regulation/reg-02-50-03. Additional information relative to incomplete grades for graduate students can be found in the Graduate Administrative Handbook in Section 3.18.F at http://www.fis.ncsu.edu/grad_publicns/handbook/.

**REQUIREMENTS FOR AUDITORS**

This class cannot be audited.

**N.C. STATE UNIVERSITY POLICIES, REGULATIONS, AND RULES**

**ACADEMIC INTEGRITY**

Students are required to comply with the university policy on academic integrity found in the Code of Student Conduct found at http://policies.ncsu.edu/policy/pol-11-35-01

**ACADEMIC HONESTY**

See http://policies.ncsu.edu/policy/pol-11-35-01 for a detailed explanation of academic honesty.

**HONOR PLEDGE**

Your signature on any test or assignment indicates "I have neither given nor received unauthorized aid on this test or assignment. "Students are responsible for reviewing the PRRs which pertain to their course rights and responsibilities. These include: http://policies.ncsu.edu/policy/pol-04-25-05 (Equal Opportunity and Non-Discrimination Policy Statement), http://oied.ncsu.edu/oied/policies.php (Office for Institutional Equity and Diversity), http://policies.ncsu.edu/policy/pol-11-35-01 (Code of Student Conduct), and http://policies.ncsu.edu/regulation/reg-02-50-03 (Grades and Grade Point Average).

**ACCOMMODATIONS FOR DISABILITIES**
Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, student must register with the Disability Services Office (http://www.ncsu.edu/dso), 919-515-7653. For more information on NC State’s policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation at http://policies.ncsu.edu/regulation/reg-02-20-01.

**NON-DISCRIMINATION POLICY**

NC State University provides equality of opportunity in education and employment for all students and employees. Accordingly, NC State affirms its commitment to maintain a work environment for all employees and an academic environment for all students that is free from all forms of discrimination. Discrimination based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation is a violation of state and federal law and/or NC State University policy and will not be tolerated. Harassment of any person (either in the form of quid pro quo or creation of a hostile environment) based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation also is a violation of state and federal law and/or NC State University policy and will not be tolerated. Retaliation against any person who complains about discrimination is also prohibited. NC State’s policies and regulations covering discrimination, harassment, and retaliation may be accessed at http://policies.ncsu.edu/policy/pol-04-25-05 or http://www.ncsu.edu/equal_op/. Any person who feels that he or she has been the subject of prohibited discrimination, harassment, or retaliation should contact the Office for Equal Opportunity (OEO) at 919-515-3148.

*This syllabus is subject to change.*