Syllabus
CSC 2211
Algorithms and Complexity
Spring 2020

Instructor: Dr. Chung-Wen (Albert) Tsao
Course Hours: Friday 6:30-10:30PM
Office hours: Monday and Friday 5:30-6:30 pm, and by appointment
E-mail: albert999tsao@gmail.com

Prerequisites

- CSC 1140 - Data Structure and Abstraction
- MTH 1320 - Calculus I

Recommended

- MTH 1330 - Calculus II
- MTH 2419 - Discrete Mathematics

Course Description

Topics: Algorithm and complexity analysis, divide and conquer algorithms, searching and sorting algorithms, dynamic programming, Greedy approach, backtracking, P and NP classes of algorithms, and parallel algorithms.

Course Learning Outcomes

- Students will demonstrate understanding of various classes of algorithms and the type of problems for which they provide solutions. (PLOs 1/2)
- Students will demonstrate competency with efficiency and analysis of algorithms (complexity). (PLO 1)
- Students will demonstrate competency with criteria and techniques for algorithm analysis and algorithm selection. (PLOs 1/2)
- Students will demonstrate algorithm implementation for solving various classes of problems. (PLOs 1/2)
- Students will write documentation and comments in their programs using javadoc. (PLO 3)

* “PLOs” refers to the 'CIS Program Learning Outcomes' which can be found in the catalog [https://www.ndnu.edu/documents/university-catalog-2018-2019.pdf#page=73](https://www.ndnu.edu/documents/university-catalog-2018-2019.pdf#page=73)
Assessment Methods:

- Through homework and programming assignments
- Through quizzes and tests

Tentative Topic Schedule
1/19 - Appendix A: Review of Necessary Mathematics

Chapter 1 - Algorithms: Efficiency, Analysis and Order

1/26 - Chapter 1 - Algorithms: Efficiency, Analysis and Order

Appendix B: Solving Recurrence Equations and Analysis of Recursive Algorithms

2/02 - Chapter 2 - Divide and Conquer
2/09 - Chapter 3 - Dynamic Programming
2/16 - Chapter 4 - The Greedy Approach
2/23 - Chapter 5 - Backtracking
3/01 - Midterm Exam - Chapters 1-5
3/08 - Spring Break
3/15 - Chapter 6 - Branch-and-Bound
3/22 - Chapter 7 - Computational Complexity: Sorting Algorithms

3/29 - Chapter 8 - Computational Complexity: Searching Algorithms

4/05 - Chapter 9 - Computational Complexity and Intractability: An Introduction to the Theory of NP

4/12 - Chapter 10 - Genetic Algorithms and Genetic Programming
4/19 - Chapter 11 - Number-Theoretic Algorithms
4/26 - Chapter 12 - Introduction to Parallel Algorithms
5/03 - Final Exam - Chapters 6-12

Homework

After each lecture, written and programming exercises will be assigned based on the material presented in class. Assignments are due at the start of the next class. You are encouraged to work together on homework assignments, sharing information, questions and hints for solving problems, though you should not copy another student’s work. If this is not clear, carefully read the section on academic honesty and plagiarism, below.

Grading Criteria

There will be a midterm exam and a final exam. In addition, written exercises will be done in class, and programming and written exercises will also be assigned as homework. Student programs will often be reviewed in class. Programs are evaluated according to the following criteria:
Does the program work (i.e., does it react in a correct or reasonable way to all input, whether that input is reasonable or not)?
- Was the program written with the tools and within the constraints outlined in the assignment?
- Does it make use of the methods and design guidelines discussed in class?
- Was reasonable judgment used in tackling any "gray areas?"
- Is the source code clear, readable and well-commented?
- Is the code efficient and to the point?

Final Grade Calculation

Final Grade = 0.20*Exercise Average + 0.25*Program Average + 0.25*Midterm Exam Score + 0.25*Final Exam Score + 0.05*Class Participation

Attendance and Preparation for Class

Attendance is mandatory. Missed classes will cause severe problems to your progress. Full preparation for every class is very important to your success.

Grading Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A+</td>
<td>97-105</td>
</tr>
<tr>
<td>A</td>
<td>93-96</td>
</tr>
<tr>
<td>A-</td>
<td>89-92</td>
</tr>
<tr>
<td>B+</td>
<td>85-88</td>
</tr>
<tr>
<td>B</td>
<td>80-84</td>
</tr>
<tr>
<td>B-</td>
<td>76-79</td>
</tr>
<tr>
<td>C+</td>
<td>72-75</td>
</tr>
<tr>
<td>C</td>
<td>67-71</td>
</tr>
<tr>
<td>C-</td>
<td>63-66</td>
</tr>
<tr>
<td>D+</td>
<td>59-62</td>
</tr>
<tr>
<td>D</td>
<td>54-58</td>
</tr>
<tr>
<td>D-</td>
<td>50-53</td>
</tr>
<tr>
<td>F</td>
<td>0-49</td>
</tr>
</tbody>
</table>

Incomplete:

An "Incomplete" may be given to a student who has maintained satisfactory attendance and work throughout most of a course, including Independent Study, but due to extraordinary circumstances is unable to complete the required work by the end of the semester/session in which the course was taken. See the College Catalog below (p.56)

1. **Average Student Workload Expectations:** Class time consists of 60 hours and students are expected to attend. Students are expected to engage in approximately 105 hours of out-of-class homework over the sixteen weeks, or approximately five hours per week. Course assignments are made in accordance with this expectation.

Workload Distribution:

<table>
<thead>
<tr>
<th>Hours in Class:</th>
<th>60</th>
</tr>
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<tbody>
<tr>
<td>Readings:</td>
<td>45</td>
</tr>
</tbody>
</table>
Written Assignments: 45
Exam Preparation: 15

Student Success Center
650-508-3696
The Student Success Center (SSC), located in the Campus Center, is dedicated to supporting students’ academic success at NDNU. The SSC provides writing and subject tutoring, test proctoring for students with accommodations, facilitates the math placement test (MPT), and is open for students from 8:00 a.m. – 10:00 p.m. with business hours from 9:00 a.m. – 5:00 p.m. For more information, see: https://www.ndnu.edu/academics/student-succes-

The goal of the Student Success Center is to promote student learning and academic innovation. Professional staff members, peer tutors, academic advisors, and faculty work together to promote a supportive educational environment. Writing and subject tutoring schedules are forwarded directly to students’ NDNU e-mails and are included in the Student Weekly Update circulated by NDNU’s Communications Department.

Writing labs are offered in lower and upper division English courses. Writing tutoring is available on a drop-in basis and virtual writing tutoring is by appointment for our off-campus sites. Basic English language assistance is provided to international students who may need support writing papers or with general English. A writing lab dedicated to both APA and MLA writing styles is also offered. Math, computer science, and the sciences subject tutoring are led by peer tutors and a professional math tutor. Subjects, schedules, and tutor details are available at the Student Success Center.

Disability Resource Center
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Students with disabilities, whether physical, learning, or psychological, who believe that they may need accommodations in this class are encouraged to contact the Disability Resource Center as soon as possible to ensure that such accommodations are implemented in a timely fashion. Please meet with the DRC staff to verify your eligibility for any classroom accommodations and for academic assistance related to your disability. Accommodations are not provided retroactively. The Disability Resource Center is located at St Joseph Hall, 117. Please contact the DRC by email at DRC@ndnu.edu or by phone at 650-508-3670.

Counseling Services
(650) 508-3714  Counselingservices@ndnu.edu  New Hall E18 / E19
The mission of Counseling Services is to promote and enhance the overall wellbeing of students so that they may reach their potential for personal growth and academic success. Counseling Services is open Monday-Friday from 9am to 5pm, and currently enrolled students are welcome to call, email or drop-by to schedule an appointment.

Course Evaluations/Teaching Effectiveness Surveys:
Spring 2020 Full-semester and Term 2 courses
Teaching Effectiveness Surveys (course evaluations) will be available online through Campus Portal from April 27 – May 15, 2020. Your feedback regarding courses and faculty is very important to Notre Dame de Namur University, to your faculty, and to me as the instructor for this course. Your feedback helps us review and improve their teaching, helps departments/programs review and improve program content, and is used by the university in making decisions about tenure, promotion, and hiring decisions for part-time faculty.

**Directions:** To access, please enable pop-ups in your browser (uncheck pop-up blocker), then in Campus Portal look for the "You have an active survey" link in the left sidebar. Click that link to open the Course Evaluation Surveys page, which has a link to a survey for each course in which you're enrolled. Your feedback is very important! Please complete your evaluations for all your courses promptly. Remember: Your responses are anonymous.

**Academic Honesty**
NDNU’s core values include learning, integrity, and honesty, values we live out in all areas of our learning community. Academic honesty means you are able to demonstrate your own knowledge and skills and receive feedback on your learning that can help you improve. By taking responsibility for your own work and avoiding actions that could give you an unfair advantage over others, you are contributing to the NDNU learning community and developing professional skills and values that will serve you well into the future. Academic honesty is one of the most important values of a university community, and breaches of this trust have serious consequences. Please see the Student Handbook for a detailed discussion of Academic Conduct expectations.

**Key Academic Calendar Dates**
- Monday, January 20 – Martin Luther King Day
- Drop Deadline: Tuesday, January 26
- Thursday, February 6: Professional Development Day
  - no classes before 3:00pm
- February 26 – March 3 – Midterm
- March 9 – 13 Spring Break
- Friday, March 4 – Midterm and Term 1 grades due
- May 1 – May 6 Finals
- Final Grades Due Friday, May 15