Lectures: 1:50pm–3:05pm Tu/Th, HERAK 301

Instructor: Shawn Bowers, bowers@gonzaga.edu, BCISE 009

Office Hours: Tue/Thu 12:30-1:30, Wed 1-3, by appointment.

Course Description: Advanced study of computer algorithms not covered in CPSC 223 along with principles and techniques of computational complexity. Topics include data structures for representing graphs, graph algorithms, greedy solutions, dynamic programming, and complexity theory including NP-completeness and polynomial-time reducibility.

Prerequisites: MATH 231 & CPSC 223. Students are expected to have a strong understanding of and ability to apply content in prior computer science courses and discrete math.

Course Supplies: There is no textbook for the course. Students must have a GitHub account for homework.

Access to Course Materials: Lecture notes, homework, and a weekly schedule will be made available on the course webpage (www.cs.gonzaga.edu/bowers/courses/cpsc450). Blackboard (learn.gonzaga.edu) will be used for posting grades. Piazza (piazza.com/gonzaga/spring2022/cpsc326) will be used for questions, discussions, and course announcements.

Grading: Grades are based on the number of points earned throughout the semester. A total of 700 points is possible. Additional points beyond the 700 may also be available as extra credit. Points are allocated across the following areas (excluding extra credit).

<table>
<thead>
<tr>
<th>Point Total</th>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>280</td>
<td>Homework</td>
<td>7 assignments at 40 points each</td>
</tr>
<tr>
<td>60</td>
<td>Final Project</td>
<td>Individual project worth 60 points</td>
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<tr>
<td>80</td>
<td>Problem Sets</td>
<td>8 problem sets at 10 points each</td>
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<tr>
<td>60</td>
<td>Quizzes</td>
<td>6 quizzes at 10 points each</td>
</tr>
<tr>
<td>160</td>
<td>Exams</td>
<td>2 midsemester exams worth 40 points each, 1 final exam worth 80 points</td>
</tr>
<tr>
<td>60</td>
<td>Attendance</td>
<td>30 class meetings (15 weeks) at 2 points per meeting</td>
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Letter grades are assigned based on the total number of points earned over the semester as follows.

A  =  644+  C+  =  532–572
A- =  623–643  C  =  504–531
B+ =  602–622  C-  =  483–503
B  =  574–601  D+  =  462–482
B- =  553–573  D  =  434–461

IMPORTANT: In addition, to pass the class you must earn at least 252 points (60%) towards homework (which includes the final project and problem sets) and 132 points (60%) towards exams and quizzes. Extra credit points are added to the total points earned and not to any specific category.

Course Policies:

Student Expectations: As a student, you are responsible for understanding and learning the course material. If you do not understand topics discussed in class, or instructions on tests or assignments, it is your responsibility to ask for help from the instructor. You can get help from the instructor during office hours, via email, or using the Piazza system set up for the course. Please start your assignments early to leave yourself enough time to ask questions and to complete the assignment once your questions are answered.

Assignment Grading: All work must be turned in on or before the due date for full credit. It is expected that all homework and project work turned in is the work of the student. Any violation of this rule will result in a grade of 0 and/or an F in the course as well as possible suspension from the University.
Assignment Late Policy: Late homework will be accepted with a penalty of 10 points (25%) if turned in up to two weeks after the due date. Work cannot be turned in for credit after the two-week late period. All course work must be submitted by the last day of finals week.

Quizzes and Exams: All exams and quizzes are to be done individually. Clear cases of collaboration will result in a grade of 0 on the exam or quiz and/or an F in the course as well as possible suspension from the University. Students with testing accommodations must contact the instructor to arrange alternative testing times as needed. There are no make-up quizzes, and missed quizzes receive 0 points.

Attendance: It is important that you attend class and keep up with course content and assignments. If you become ill or have another emergency that prevents you from attending class, contact the instructor as soon as possible to make alternative arrangements. You will receive up to 2 points per class period. These points will be based on attendance and class participation. If you are unable to attend class due to an illness or other emergency, you must notify the instructor as soon as possible to discuss your situation and determine a suitable course of action to make up the corresponding points.

Office Hours: You are strongly encouraged to take advantage of office hours or make an appointment to meet with the instructor if you have questions about the course material. Office hours are a great way to ask questions and get one-on-one help with the material.

Academic Integrity: You are expected to follow the University’s policy on academic integrity. Please see the policy on the University’s webpage for more information, including procedures for violations. If you are unclear about the policy or how it applies to this class please ask the instructor.

Incomplete Grades: University Policy states that incomplete grades can be “Given when a student with a legitimate reason as determined by the instructor, does not complete all the work of the course within the semester that he/she is registered for the course.” A grade of incomplete is given to students who find themselves in situations beyond their control and that make academic success near to impossible. The Center for Cura Personalis and Academic Advising & Assistance are available to help in such situations. A grade of incomplete will not be granted for students due to a heavy course workload or because they have fallen behind in their coursework due to inadequate time management.

ABET Specific Outcomes of Instruction: Students completing the course will:

1. Analyze the asymptotic runtime complexity of problem solutions
2. Solve recurrence relations to analyze asymptotic runtime
3. Understand the differences and implications of computational complexities
4. Understand types of algorithmic approaches and how to apply algorithm design techniques
5. Understand the meaning and implications of NP-Complete problems
6. Understand traditional algorithms and algorithmic problems in computer science
7. Experience designing and implementing various algorithms

University Academic Policies & Procedures: A full list of academic policies and procedures at the University are available at: www.gonzaga.edu/academics/academic-calendar-resources/registrars-office/policies-procedures/academic-policies-procedures. Note that new policies are added and modified frequently.