Lectures: Monday, Wednesday, Friday, 2:10–3:00, PACCAR 105

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

Office Hours: Monday and Wednesday 3:00–4:30, Friday 12:00–1:00, or by appointment.

Course Description: This course covers approaches, techniques, and tools for leveraging large and complex data used in analytics projects. Through hands-on assignments, students learn relevant concepts, architectures, programming models, and tools related to data modeling and storage, extract-transform-load (ETL) processes, data warehousing, and data pipeline creation and management. The course also explores scalable, distributed, and cloud-based approaches used in the design and implementation of data-intensive applications.

Prerequisites: CPSC 321 and either CPSC 223 or CPSC 322.

Course Supplies: There is no textbook for the course. Students must have a GitHub account for homework as well as a Google account. Materials for reading assignments will be provided to students.

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/cpsc324). Canvas (canvas.gonzaga.edu) will be used for posting grades. Piazza (piazza.com/gonzaga/spring2024/cpsc324) 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>240</td>
<td>Homework</td>
<td>6 assignments worth 40 points each</td>
</tr>
<tr>
<td>80</td>
<td>Reading</td>
<td>4 reading assignments worth 20 points each</td>
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<tr>
<td>60</td>
<td>Project</td>
<td>final course project</td>
</tr>
<tr>
<td>60</td>
<td>Quizzes</td>
<td>6 quizzes at 10 points each</td>
</tr>
<tr>
<td>220</td>
<td>Exams</td>
<td>2 midsemester exams (60 pts each), one final (100 pts)</td>
</tr>
<tr>
<td>40</td>
<td>Attendance</td>
<td>≈ 40 class meetings (15 weeks) at 1 point per meeting</td>
</tr>
</tbody>
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Letter grades are assigned based on the total number of points earned over the semester as follows.

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

**IMPORTANT:** In addition, to pass the class you must earn at least 228 points (60%) towards homework (which includes the final project, homework, and reading assignments) and 168 points (60%) towards exams and quizzes. Extra credit points are added to total points earned and not 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, during class meetings, or using Piazza. Start your assignments early to leave yourself enough time to ask questions and to complete the assignment once your questions are answered.

**Collaboration Policy:** Student collaboration is limited to high-level discussions concerning lecture content, lecture notes, and assignment instructions. Students may also discuss and help each other with the setup and general use of software tools, including git, GitHub, IDE configuration and use, debuggers, and so on. However, all submitted answers to assignments, quizzes, exams, and projects **must** be the individual work of the student. You are **not** allowed to copy all or part of another student’s answers, develop answers with another student, or copy and submit work from external sources without explicit permission of the instructor. Note that external sources includes IDE extensions such as copilot, systems based on large language models such as ChatGPT, and the Internet in general. Similarly, obtaining and/or looking at another student’s answers and/or knowingly giving your work to another student is **not** permitted.

**Academic Integrity Violations:** Violations to the collaboration policy will result, at a minimum, of a 0 grade for the submission. Additional penalties may also be applied, including a grade of ‘F’ in the course and/or expulsion from the University (see the University’s academic honesty policy for additional details). Note that violations found **after** the completion of the course, including after a degree has been awarded, can be applied retroactively. Note that submitting work based on help that you received but that you do not fully understand as well as providing another student with help that leads them to a solution that they do not fully understand are both violations of the policy. The instructor reserves the right to ask students to explain, justify, and/or recreate their answers to any work they have submitted in the course. Questions concerning the collaboration policy, including clarification regarding what constitutes a violation, should be directed to the instructor.

**Late Policy:** All homework and project assignments must be turned in on or before the due date to receive full credit. Work completed after the due date can be submitted up to two weeks late with a penalty of 25%. All homework and project assignments must be submitted by the last official day of the semester to be considered for grading. **Note that assignments in this class are largely cumulative, requiring successful completion of prior assignments.** If you experience a serious emergency situation (medical or otherwise) that prevents you from being able to complete an assignment by the due date, it may be possible to arrange a no-penalty alternative schedule with the instructor. In such situations, students are also encouraged to contact the Center for Cura Personalis.

**Quizzes and Exams:** Quizzes and exams are to be completed during their scheduled times. **Missed quizzes and exams will receive a score of 0.** If you are unable to attend class due to a documented illness or emergency, you must contact the instructor prior to the class to make alternative arrangements. Students with testing accommodations are encouraged to contact the instructor to discuss their testing needs and/or to make arrangements with the Testing Center.

**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 1 point per class period based on participation and attendance. **Laptops and other electronic devices used during class lectures are highly discouraged, but if used, are only allowed for the purpose of note taking.**

**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.
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. Understand the challenges of acquiring and processing large and complex data sets within the context of typical data analytics workflows and enterprise solutions
2. Understand challenges, techniques, and frameworks for developing applications that utilize large and complex data
3. Build and deploy analytics solutions using existing frameworks and solutions for managing large and complex data

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.