Ball State University
Department of Computer Science

Fall 2026 - CS 380 Theory of Computation
Course Syllabus & Policies

1 Course Basics & Instructor Information

Class Schedule

CS 380 Theory of Computation, CRN: 21805, Fall 2026; Tue, Thu 11:00 AM - 12:15 PM

Instructor Information and Office Hours

Professor: Jay Bagga, Department of Computer Science, Ball State University, Muncie, IN
Contact Information and Office Hours: Posted on the Canvas site for this class.

2 Course Information & Objectives

Catalog Description

Mathematical logic; alphabets and languages; finite automata, regular and nonregular language, Kleene's theorem; regular grammars; pushdown automata and context-free grammars; Turing machines; recursive and recursively enumerable languages; the Chomsky Hierarchy.

Prerequisite

CS 224 with C- or better grade.

Course Objectives

This course aims to introduce to the computer science majors the theoretical underpinnings of the science of computation. By the end of this course, students should be able to:

- Identify, compare, and contrast the classes of languages and machines in the Chomsky hierarchy.
- Determine if a language is regular.
- Derive alternative forms of representation for a regular language.
- Determine if a language is context free.
- Derive alternative forms of representation for a context-free language.
- Design and implement a top-down parser.

Course Modality/Structure

This course is taught in-person.

Planned Topics

The topics in the Catalog description above are covered in Chapters 0 through Chapter 4 of the textbook. A detailed schedule of topics will be posted/updated on Canvas.

- Introduction and Math Background (1 week); Regular Languages and Finite State Automata (5 weeks); Context-Free Languages and Pushdown Automata, Parsing (5 weeks); Introduction to Computability (3 weeks)

3 Course Materials

Required Text

M. Sipser. *Introduction to Theory of Computation*, 3rd ed. Cengage,
ISBN-13: 978-1-133-18779-0; ISBN-10: 1-133-18779-X
For more information about obtaining required course materials, see Ball State First Day.

Recommended Supplementary Material and Tools

- Elaine Rich, Automata, Computability and Complexity: Theory and Applications, Pearson Prentice Hall. Free pdf copy available: Automata, Computability and Complexity.
- LaTeX tool project for activities: Overleaf.com

4 Course Assignments and Assessments

Course Assignments

Assignment details, including instructions, relevant readings, due dates, and grading criteria/rubrics will be posted and updated on Canvas. Please check Canvas regularly to stay informed and on track. Late submissions are not permitted.

Reading and Practice Assignments

Readings from the course materials and practice assignments will be posted regularly on the Canvas site. To learn and to get a good grasp of the topics, it is essential and highly recommended that you complete these assignments by their posted due dates.

Research Project

Each student (or a Team of two students) will select a topic related to this class, conduct research on the topic, create and submit a research proposal and make a presentation in the class. A detailed schedule of project activities will be posted/updated on Canvas.

Quizzes

There will be three quizzes. Each quiz must be completed on paper, in-person, in class. There is no makeup for a missed quiz. Generally, the time allowed to complete a quiz will be 30 minutes.

Exams

There will be three exams (Exam 1, Exam 2, and Final Exam). Exams must be completed on paper, in-person, in class. A detailed schedule of exams will be posted/updated on Canvas. If you anticipate missing an exam, prior arrangement with the instructor must be made.

Course Grading Distribution

The following weighted layout will be used to determine your performance and final grade in the class:

- Research Project Activities: 25%; Quizzes: 20%; Exam 1: 15%; Exam 2: 15%; Final Exam 25%

Final Grade Percentages

A:$\geq 90\%$**; B:** $\geq 80\%$**; C:**$\geq 70\%$**; D:** $\geq 60\%$.

Note: +/- grades may be used within these designated percentage ranges.

Attendance

Attendance is expected at all class meetings.

- If you miss a class, you are responsible for studying and learning all information from the missed class, by using the textbook, Canvas lecture notes, and other relevant materials.
- You should expect to spend at least six to eight hours per week to complete your reading and homework assignments, and to prepare for quizzes and exams.
- Attendance will be taken in all class meetings.
- Absences will be excused for the following: funeral and bereavement leave, jury duty, late course addition, military absences, observance of religious holidays, pregnancy leave, student-athletes participating in University or department approved activities, and university advisories.
- In general, students are expected to notify all their instructors once they anticipate being absent for any reason (e.g., funeral) or as soon as possible after the absence begins (e.g., unexpected injury or illness)
- The student may need to provide documentation (with confidential information redacted when appropriate) to each instructor if requested.

5 University Policies and Statements

University Statement

We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse. If you need course adaptations or accommodations because of a disability, please contact the instructor of record as soon as possible. Ball State's Disability Services Office coordinates services for students with disabilities; documentation of a disability needs to be on file in that office before any accommodations can be provided. Disability Services can be contacted at 765-285-5293 or dsd@bsu.edu.

Freedom of Expression

In this course, we are committed to fostering a learning environment that values intellectual diversity, encourages free expression, and promotes open inquiry. As members of the Ball State Community, we treat each person in the Ball State community with civility, courtesy, compassion,and dignity and respect and learn from differences in people, ideas, and opinions. Please review Ball State University's Statement on Freedom of Expression, the resources on Ball State's Freedom of Expression webpage, and Ball State's Beneficence Pledge.

Title IX

Ball State University is committed to providing a safe and inclusive learning environment for all students. If you or someone you know has experienced sexual harassment—including sexual assault,dating violence, domestic violence, or stalking, please know that you are not alone. The University offers support services and resources. For more information or to report an incident, please visit BSU Title IX website or contact the Title IX Coordinator at 765-285-1545 or at titleix@bsu.edu.

As your instructor, I am a mandatory reporter under the Title IX policy and required to report any information I receive about possible sexual harassment. This includes information shared in class discussions, assignments, or private conversations.

What happens after I report? The Title IX Coordinator will email the person who experienced sexual harassment (complainant) and invite them to schedule a meeting. If the complainant **chooses** to meet with the Title IX Coordinator

- Title IX Coordinator will offer supportive measures (e.g., counseling, extensions on deadlines, course-related adjustments, changes to work or class schedules, and/or referrals to campus offices), review the policy, and discuss options to move forward.
- If a complaint is filed by the complainant or the University, an investigation will begin following University policy.

University Grade Appeal Policy

If you believe you received a final course grade that does not reflect your performance due to fairness or a procedural issue, you have the right to file an appeal within 5 school days after final grades are posted by the Office of the Registrar. Review the University Grade Appeal Policy and Process.

Student Academic Ethics Policy

Honesty, trust, and personal responsibility are fundamental attributes of the university community. Academic dishonesty and other forms of academic misconduct threaten the foundation of an institution dedicated to the pursuit of knowledge and will not be tolerated. To maintain its credibility and reputation, and to equitably assign evaluations of scholastic and creative performance, Ball State University is committed to maintaining a climate that upholds and values the highest standards of academic integrity. Visit the VPAA's academic integrity website (Students tab) for resources on understanding academic integrity, citing sources properly, and avoiding inadvertent academic dishonesty. To learn about BSU's academic integrity expectations and students' rights, please read the University Student Academic Ethics Policy.

Academic integrity violations include giving or receiving an unfair academic advantage (cheating), presenting someone else's ideas or work as your own (plagiarism), and falsifying academic records. Unless otherwise indicated, you must work independently by yourself. Check with me if you are unsure whether something constitutes academic dishonesty. Examples of academic integrity violations include but are not limited to:

- Using resources not authorized by the faculty member (including devices, AI tools, hidden notes, and open books)
- Using commercial study websites to find answers to graded assignments (Chegg, Course Hero, StudyPool, OneClass, etc.).
- Without the instructor's written permission, giving away, buying, or selling graded assignments class notes, exams, study guides, or other course materials to other students or to third-party vendors (Course Hero, Chegg, 24HourAnswers, etc.).
- Working with another person on any assignment other than authorized group projects.
- Sharing or allowing others to access your files, whether done with permission or not.
- Reusing your own work from another semester, course, or section.
- Sharing answers with others during exams (passing notes, texting, whispering, gesturing)
- Discussing exam questions and answers with students who have not taken the exam.
- Soliciting others to complete work for you.

Generative AI Statement

Conditional Use (Specific or limited GenAI use permitted): GenAI use is permitted only for Research Project Activities as outlined below.

At Ball State, we use GenAI to elevate human potential, not replace it. To succeed in an AI-infused world, students must balance technical skills with durable skills, lifelong abilities such as critical thinking, ethical judgment, communication, accountability, and responsible decision-making that define a Ball State graduate. Developing these durable skills requires you as students to think carefully about: when AI should and should not be used; how to use AI responsibly; how to verify AI-generated information, and; how to remain accountable for final work.

Research Project Activities: You may use GenAI tools for some work for your Research Project Presentation in this course. Any use outside of this permission constitutes a violation of Ball State University's Student Academic

Ethics Policy. You, the student, are always responsible for the content you present or submit, share, or act upon, regardless of whether GenAI tools assisted in the process. For data security reasons, please use BSU-approved GenAI tools (e.g., BSU Gemini, NotebookLM), which support single sign-on (SSO) with BSU ID and password. Commonly used public GenAI tools carry a higher risk of data being shared externally. In contrast, when using BSU-approved GenAI tools, any data you input is protected within the BSU system. Instructors do not have access to BSU IT Center logs of GenAI tool usage, so student data shared through BSU-approved GenAI tools remain private.

Quizzes and Exams: All work conducted and/or submitted must be your own, completed in accordance with the Ball State University's Student Academic Ethics Policy. These are closed-book assessments and no devices (such as laptops, smartphones) are allowed when you are completing these assessment, and you may not collaborate with or make use of Google Gemini or any other generative AI applications. All work produced in submitted quizzes and exams should reflect your own ideas and demonstrate your current knowledge, abilities, and skills. Therefore, GenAI should not be used to complete any portion of quizzes and exams. Doing so constitutes a violation of Ball State University's Student Academic Ethics Policy.

6 Student Support Services

Students can benefit from free tutoring and coaching at the Learning Center, writing practice and feedback at the Writing Center, mental health assistance at the Counseling Center, and public speaking assistance at the Speaking Center.

7 Canvas and Student Privacy

Canvas Accessibility

Canvas provides a user experience that is easy, simple, and intuitive. Special attention has been paid to making Canvas screen-readable. The Rich Content Editor encourages users to create accessible content pages (i.e. text formatting is accomplished using styles).

FERPA and Privacy

As a student, your educational records are considered confidential. Under FERPA (Family Educational Rights and Privacy Act), your records are confidential and protected. Under most circumstances, your records will not be released without your written and signed consent. However, some directory information may be released to third parties without your prior consent unless a written request to restrict this is on file. You can learn more about student rights to privacy by visiting Ball State's BSU FERPA website.

8 Course Expectations and Policies

Late Submissions Policy

All assignments, quizzes, and exams are due by the time due specified in the assignments and exams. No late assignments or quizzes will be accepted. Technical issues, such as loss of internet connection or a malfunctioning personal computer, are not valid excuses for late work unless the problem stems from BSU Canvas servers. Failure to turn in an assignment, quiz, or exam will result in a loss of all the points allocated for that assignment, quiz, or exam. Canvas will not accept an assignment or quiz after the specified time due.

Make-up Exam Policy

Make-up exams will be considered only if you discuss this with the instructor prior to the exam (if this is possible) and obtain the instructor's approval in advance. Anyone missing an exam without the instructor's approval will receive the score 0 for that exam.

Posted Grade Policy

Direct any questions you have about any assignment, quiz, or exams to the instructor within one week after the grade is posted on Canvas. Thereafter, the posted grade will be final.

9 Course Schedule & Subject to Change

Course Schedule

To support a learning experience that is responsive to the needs, interests, and pace of our class community, the course schedule may shift over the semester. The most current version of the schedule will always be available on Canvas. I encourage you to check Canvas regularly for updates and contact me if you have any questions.

Subject to Change Statement

This syllabus is subject to change in the event of extenuating circumstances.