

## CS 1310: Intro-Computational Thinking

CRN: 18455

MW 10:30-11:50 am via Blackboard Collaborate Ultra

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### Course Description

Catalog Description: "Introduction to Computational Thinking (3-0) Common Course Number: COSC 1301 An introduction to computational thinking: Computational thinking is the process of converting a real-world problem into software-based approach for solving it. Towards that goal, students are analytically engaged in the creation of programs that address the challenges of drawing shapes, animating familiar phenomena, and generating graphical representations of problems of relevance to their academic major. Students learn analytical skills that are transferrable to many other disciplines."

As a Core Curriculum class, an important goal of CS 1310 is to develop students' problem-solving and critical thinking skills. Students work individually and in groups to facilitate effective communication as they investigate topics, generate hypotheses, gather data, and build skills in software strategies to process and represent data. As part of their projects, students evaluate their results; generate conclusions; make predictions, pose new questions raised by their work; and examine the impacts of technology on society as well as the individual.

### Course Objectives or Expected Learning Outcomes

At the end of this course, students will be able to:

- Learn to communicate effectively and appropriately in a variety of settings in order to present their ideas and interact with others, including those who may not understand or agree with them;
- Work individually, in pairs, or as part of a larger group in order to solve problems, complete projects, or share experiences;
- Understand the problem-solving process and apply concepts to real-life situations and data-oriented problem analysis;
- Develop a basic understanding of historical computing developments, including hardware devices and software languages;
- Develop the skills necessary to translate algorithms into software instructions in a high-level language in order to solve problems using a computer;
- Apply basic data science techniques, using a combination of predefined functions as well as their own data and instructions, in order to create and analyze visual representations of data gathered on a topic;
- Analyze and extend their work by making inferences and predictions based on the results of their projects, and by posing new questions generated by the results;

- Articulate some of the issues surrounding impacts of technology on society as well as the individual, including consideration of ethical issues.

## **Required Materials**

All materials for the course will be available at online websites or will be posted in Blackboard/Piazza. All students should have regular access to a computer, Blackboard, Piazza, Gradescope and your UTEP email.

## **Course Assignments and Grading**

Approximate Grade Distribution:

900-1000 = A      800-899 = B      700-799= C      600-699 = D      Below 600= F

- 300 points: Semester Project
- 250 points: Larger Assignments (5 assignments @ 50 points for each)
- 150 points: Programming Labs (3 labs @ 50 points each)
- 140 points: Quizzes (4 quizzes @ 35 points each)
- 160 points: Active Participation

**Semester Project:** Your semester project will consist of gathering, processing, creating visual displays, and analyzing data gathered on a topic of your choice. As part of this project, you will be required to evaluate and document your data sources and evaluate and extend results of your project.

**Larger Assignments:** These assignments will build skills in applying concepts gained from reading assignments.

**Programming Labs:** Labs will allow students to understand concepts common to many programming languages and will help them develop the programming skills required to complete their semester projects.

**Quizzes:** Quizzes will be taken on Blackboard and will cover topics as stated in the course schedule.

**Discussion Board posts:** Students be required to participate in weekly discussion boards using Blackboard, requiring both an initial post and at least one response to your peer(s) in order to receive full credit.

**Smaller Assignments:** These assignments are often a smaller, incremental part of a larger project.

## **Participation Policy**

Because the course is scheduled in a short summer session, students often will have assignments due on a daily basis, and therefore should check their UTEP email and Blackboard and Piazza daily. Students who fail to participate online or turn in assignments for more than a week (unless for a

compelling reason, which should be reported to the instructor) will be dropped from the course.

## Technology Requirements

Course content is delivered via the Internet through the Blackboard learning management system (LMS). Ensure your UTEP e-mail account is working and that you have access to the Web. You may use any of the primary Web browsers—Explorer, Google Chrome, Firefox, Safari, etc. When having technical difficulties, try switching to another browser.

You will need to have or have access to a computer/laptop with a webcam and a microphone. You may find it helpful to have a printer, scanner, or other device, but these are not required. Please check that your computer hardware and software are up-to-date and able to access all parts of the course. **If you encounter technical difficulties of any kind, let us know and contact the [Help Desk](#).**

## “Netiquette”

- Always consider your audience. Remember that members of the class and the instructor will be reading **any postings**.
- Respect and courtesy must be provided to classmates and to instructor at **all times**. No harassment or inappropriate postings will be tolerated.
- When reacting to someone else’s message, address the ideas, not the person. Post only what anyone would comfortably state in a F2F situation.
- Blackboard is not your social media site or a public Internet venue; **all postings to it should be considered private and confidential**. Whatever is posted on in these online spaces is intended for classmates and the professor/TA only. Please do not copy documents and paste them to a publicly accessible website, blog, or other space. If students wish to do so, they have the ethical obligation to first request the permission of the writer(s).

## Late Work Policy

Assignments are due by 11:59 on the date shown in the course schedule. Unexcused late work will be subject to a grade reduction.

## Drop Policy

If you cannot complete this course for whatever reason, please contact me first. To drop this class, you may need to get approval from your advisor; please check your department’s policy on drops.

## Accommodations Policy

The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the [UTEP Center for Accommodations and Support Services](#).

## Scholastic Integrity

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as ones' own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the [Office of Student Conduct and Conflict Resolution \(OSCCR\)](#) for possible disciplinary action. To learn more [HOOP: Student Conduct and Discipline](#).

## Student Resources

UTEP provides a variety of student services and support:

- [UTEP Library](#): Access a wide range of resources including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.
- [Help Desk](#): Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus.
- [University Writing Center \(UWC\)](#): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.
- [Math Tutoring Center \(MaRCS\)](#): Ask a tutor for help and explore other available math resources.
- [History Tutoring Center \(HTC\)](#): Receive assistance with writing history papers, get help from a tutor and explore other history resources.
- [Military Student Success Center](#): UTEP welcomes military-affiliated students to its degree programs, and the Military Student Success Center and its dedicated staff (many of whom are veterans and students themselves) are here to help personnel in any branch of service to reach their educational goals.
- [RefWorks](#): A bibliographic citation tool; check out the RefWorks tutorial and Fact Sheet and Quick-Start Guide.

## Course Outcomes

**Level 1: Knowledge and Comprehension:**

Level 1 outcomes are those in which the student has been exposed to the terms and concepts at a basic level and can supply basic definitions. Upon successful completion of this course, students will be able to describe, at a high level:

1. Basic computer hardware organization and high-level understanding of operating systems, editors, compilers, interpreters, networks, and common applications
2. Computer representation of simple data types and operations, including binary/decimal conversions
3. Contributions of significant developments and historical figures in computing
4. Basic features and differences between high-level programming languages
5. Fundamental concepts such as abstraction, decomposition, and procedural control flow
6. Examples of how computing applications have contributed to different fields
7. The relationship between computing and society, including ethical, legal, and security issues

**Level 2: Application and Analysis:**

Level 2 outcomes are those in which the student can apply the material in familiar situations, e.g., can work a problem of familiar structure with minor changes in the details. Upon successful completion of this course, students will be able to:

1. Apply problem-solving and critical thinking skills to analyze problems and express solutions in pseudocode algorithms
2. Implement algorithms in a high-level language, including the correct use of:
  - a. Basic variable types and user-defined data types
  - b. Arithmetic and logical expressions
  - c. Iteration and selection control statements
  - d. Simple I/O operations, which may include files
  - e. Pre-defined functions
  - f. User-defined functions and modules
3. Apply professional programming style and practices such as input validation
4. Use testing and debugging strategies, including black-box and white-box testing with test plans to identify software faults, and evaluate their projects and results
5. Use teamwork roles and methods in the classroom

**Level 3: Synthesis and Evaluation**

Level 3 outcomes are those in which the student can apply the material in new situations. This is the highest level of mastery. Upon successful completion of this course, students will be able to apply Level 1 and 2 outcome skills to develop solutions for new computing-based problems of their choice. Students will be able to:

1. Propose hypotheses and research topics of student choice (subject to approval), gather and process data to support the topic, and design and produce programs to produce data visualizations for the data (subject to the constraints of the programming environment).
2. Document and evaluate data sources used, and interpret data visualizations produced in terms of: effectiveness of data presentation, their original hypotheses vs. project results, any issues/problems encountered during the project, and usefulness of visualizations as a basis for decision-making or predictive analysis.
3. Showcase their projects to classmates, and evaluate projects of other students